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The Surveyor

And Municipal and County Engineer.

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INDEX.

A

Aberdeen Water Supply, 182
Abergavenny Municipal Works and Undertakings, 89, 102
Aberystwyth Surveyorship, 193
Afforestation, 181
Aggregates, Proportioning Materials of Concretes by Surface Areas of, 209
Air-Raid Damage to Public Works, 132, 133, 247
Alignment of Roman Roads, 163
American Municipal Engineers' Salaries, 134
America, Utilisation of Garbage in, 208

ANNUAL REPORTS :—
Aberdeenshire, 56
Berkshire, 106
Birmingham, 110
Cape Town, 254
Essex, 54
Johannesburg, 214, 233
Kent, 248, 258
Lincoln, 117
Middlesex, 62, 70
Northamptonshire, 64
Nottinghamshire, 187, 188
Worcestershire, 98
Army and Highway By-laws, 19
Asphalt Construction in Rainy Weather, 184

ASSOCIATION OF MANAGERS OF SEWAGE DISPOSAL WORKS :—
Annual Meeting and Dinner, 287, 293
Meetings, 131
Presidential Address, 55
Auckland, New Zealand, Concrete Roads, 30
Auckland, New Zealand, Municipal Work at, 15
Aylesbury, Municipal Work in, 114

B

Barry Public Works, 186
Baths, Maidstone Public, 91
Berkshire Road Damage, 106
Birmingham Arterial Roads Improvement, 200, 211
Birmingham, Municipal Engineering Work in, 110
Bognor's Piggeries, 247
Bridgwater Municipal Works, 137, 155

BRITISH WATERWORKS ASSOCIATION :—
Annual Meeting, 170
Amended Constitution, 215
Building By-laws, 85, 87, 294, 301
Building Contracts, Government, 109
Building Industry Committee, Municipal Engineers and the, 254
Building Lines, 27, 265
Bundling Press, Guest's, 108
By-laws, Invalid, 157, 169

C

Camp Drainage and Sanitation, 245
Canada, Municipal Housing in, 38
Cape Town Municipal Work, 254
Cast-iron Mains, Corrosion of, 4
Children and Salvage, 90
Coal Economy, 107, 115
Coal Rationing, Councillor and, 134
Cob Building, 182, 194, 212, 222
Comparative Road Costs, 145
Compulsory Land Purchase, 11
Concrete Aggregates, 25
Concrete, Compression Tests of, 191
Concrete Highway Bridge Design, 8

CONCRETE INSTITUTE :—
Presidential Address, 277
Concrete Roads, 30, 63, 122, 140, 195, 266, 274
Condemned Property, Cost of Demolishing, 144
Condensation on Concrete, 182
Control of Microscopic Organisms in Water Supplies, 2
Control of Roads, 52, 67, 182
Control of Small Sewage Works, 183

CONCRETE INSTITUTE (*continued*) :—
Cooper, Presentation to Mr. C. H., 10
Cornwall, Steel-tyred Traffic in, 196

CORRESPONDENCE :—
Amalgamation Proposals, The, 230, 247
Bituminous Roads, 170
Cob Building, 182, 194, 212, 222
Concrete in House Building, 269
Concrete Roads, 194
Dangerous Trees, 269
House Building, Concrete in, 269
Housing Problem, The, Condensation on Concrete, 182
Institution of Municipal Engineers and War Bonuses, 26, 170
Interrupted Studies, 302
London's Water, 222
Military Service, Public Appointments and, 62
Municipal Engineers, Training of, 302
National Kitchens, 170
Overseas Troops, Christmas Hospitality for, 257
Projecting Shop-window Blinds in Streets, 83
Road Construction and Quarrying Companies, The, 295
Roads After the War, Reconstruction and Maintenance of, 54, 83
Roadside Timber, 156
Roman Roads, The Alignment of, 163
Small House Construction, Can it be Cheapened? 143
Superannuation, 194
Surveyors' Salaries, 38, 83
Tar-macadam *v.* Tarred Slag, 194
Tar-spraying, 14
The Miner's Bath, 98
War Bonus, The Institution of Municipal Engineers and, 170

Corrosion of Cast-iron Mains, 4
Corrosion of Ferro-Concrete, 30
Corrosion of Ironwork, 43
Corrugation of Road Surfaces, 270
County Councils and Housing, 194, 196
Crystal Palace Engineering Society, 308

432528

D

Damages, Corporation's Right to, 205
Dangerous Places near Highways, 133, 145
Disinfestation Chamber, Portable, 307
Doctrine of Misfeasance, 109
Dry Rot, Wood Construction and, 97

E

East Barnet Municipal Piggeries, 35
Economy in House Building, 303
Empire Water Power, 90
Engineering Work, Women and, 88
Engineer in War, 218
Engineers and the Ministry of Health, 49
Engineers, Training of, 1, 3, 18, 31, 279, 302
English Public Health Administration, 145
Essex Roads, 54
"Extras," Contractor's Claim for, 290

F

Ferro-Concrete, Corrosion of, 30
Fertiliser Value of Sludge, 103
Finsbury's Motor Sweeper, 28
Fire Brigade Areas, 62
Fire Brigade Co-operation, 88
Fire Brigades and Fire Prevention, 97
Fire, New Substance for Fighitng, 86
Footbridges, Repair of, 73
France, Military Road Works in, 219, 231
Fuel and Lighting Order, 104, 108, 114, 134, 146, 171
Fuel Rationing, 37
Future of Heavy Motor Traffic, 5

G

Government Building Contracts, 122
Granite Chippings and Cyclists, 50
Grants to Municipal Employees, 178
Gravel Heaps on Roadsides, 188

H

Holborn Communal Kitchen, 282, 283
Hornsey, Metal Salving at, 14
Horse Hire *v.* Purchase, 76
Horses, Price of, 54
Hospital Accommodation for Consumptives, 224

HOUSING AND TOWN PLANNING :—
Advisory Panel's Scheme, 11
Baths, 154
Building Proposals, 238
Canada, 38
Cob Building, 182, 194, 212, 222
Compulsory Land Purchase, 11
Condemned Property, 144
Condensation on Concrete, 182
Conferences, 1, 6
Cost of Land, 271
Cost of Small House Construction, 143
County Councils and Housing, 194, 196
Data for Cottage Building, 185
Dublin, 76, 85, 229
Economy in Building, 303
Government Scheme, 166, 212, 217
Housing and Reconstruction, 121
Housing Bonds, 25
Housing Registries, 157
Ideal Cottage Home, 297
Ireland, 196, 212, 229
Labour Suggestions, 107, 109
Local Authorities' Proposals, 32, 76
L.G.B. Annual Report, 207
Liverpool's Back-to-Back Dwellings, 305
London, 205
Materials and Construction, 13, 15, 16, 77
Municipal Cottages, 29
Nationalisation, 230
National Kitchens in New Housing Schemes, 271
Obligatory Planning, 198
Officials and the Housing, Town Planning, &c., Act, 6
Preparation of Schemes, 6
Problem of Rural Districts, 76
Points in Housing, 217, 223, 236
Points in Town Planning, 135, 232, 260
Post-War Schemes, 244
Private Enterprise, 128, 133
Public Utility Societies, 154, 177, 271, 301
Queensland Town Planning, 266
Reigate's Timber-built Houses, 133
Regional Planning, 197
Royal Sanitary Institute Committee's Report, 303
Scottish Architectural Competition, 107
Scottish L.G.B. Memorandum, 123
Scottish Type Plans, 123
Scottish Women's Report, 253, 256
Sheffield, 25
Simplification of Construction and Sanitary Arrangements, 303
Sites and Types of Dwellings, 13, 15, 16
Stretford, 51
Supply of Materials, 185
Tilbury, 190
Town Planning and Reconstruction, 205
Tudor Walters Committee's Report, 67, 243
University of Liverpool Department of Civic Design, 187
Welsh Competition Awards, 92
Women and Internal Planning, 139, 185, 253, 256
Hull's Haulage Wagons and Sweepers, 306
Influence of Motor Vehicles upon Road Construction, 221
Inland Waterways, 182
Institute of Arbitrators, 196

INSTITUTE OF CLEANSING SUPERINTENDENTS :—
Annual Conference, 99, 101, 111, 127, 151, 164
Presidential Address, 101

INSTITUTION OF CIVIL ENGINEERS—
Meetings, 267, 270, 278

INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS :—
Abergavenny Meeting, 89, 102
Amalgamation Proposals, 169, 230, 247
Barry and Penarth Meeting, 186
Bradford Meeting, 15, 16, 77
Bridgwater Meeting, 137, 155
Holborn Meeting, 279, 281, 282
Maidstone Meeting, 63, 74, 79
Middlesbrough Meeting, 150, 160
Roads Conference, 27, 39, 41, 59, 65, 152, 162, 200, 211
Stretford Meeting, 51, 53
Town Planning Conference, 1, 6, 12, 135, 197

INSTITUTION OF MUNICIPAL ENGINEERS—
Activities and Growth, 169, 172
Amalgamation Proposals, 169, 230, 247
Annual Meeting at Southall, 173, 183
Aylesbury Meeting, 114
Bonuses, 26
Council Meetings, 26, 46, 74, 92, 143
Council's Report, 173
District Meetings, 68
Institution and War Bonuses, 170
Northern District, 106
Oxted Meeting, 74, 80, 86, 87
Presidential Address, 169, 174
Spalding Meeting, 52
Subject-Matters for Papers, 167
Wolverton Meeting, 26, 131

INSTITUTION OF WATER ENGINEERS :—
Summer Meeting in London, 3, 19, 31
Winter Meeting in London, 311
Interrupted Studies, 302
Invalid By-laws, 157, 169
Investigations in the Structure of Road Surfaces, 267
Ireland, Salaries in, 37
Irish Main Roads, Proposed Nationalisation of, 230
Ironwork, Corrosion of, 43
Isle of Ely Road Maintenance Costs, 251

J

Jerusalem's New Water Supply, 73

K

Kent Road Maintenance Costs, 248
Kent Roads, 53
Kilkenny Assistant County Surveyorship, 61

L

Labour, Local Authorities and the Resettlement of, 242
Labour Saving Device, 178
Land Acquisition, 277
Law Affecting Public Highways, 158

LAW NOTES :—
Ancient Lights : Light to a Doorway, 268
Employee of Local Authority : Mobilisation : Dismissal : Local Government (Emergency Powers) Act, 1916, 19
Highway : Obstruction Due to Rainfall : Accident : Liability of Highway Authority, 68
Water Supply : Leakage in Communication Pipe : Opening-up Road : Expenses : Metropolitan Water Board (Various Powers) Act, 1907, sec. 17, 248

LAW QUERIES :—
Building By-laws : Addition to Building, 268
Building By-laws : "New Building," 68
Burial Ground, 268
By-laws : Cross Wall, 161
Caravan Dwellings : Sanitary Arrangements and Water Supply, 212
Combined Drainage, 91
Contract with Officer of Local Government Board, 128
Dangerous Wall, 76
Drain or Sewer : Repair, 305
Erecting Building Without Plans, and Without Otherwise Conforming with the By-laws, 149
"Erection" : Wooden Fence, 142
Excavation Near Highway : Fence in Bad Repair, 248
Extraordinary Traffic, 19
Fencing : Sec. 68 Railway Clauses Consolidation Act, 1845, 113
Footbridges, Repair of, 7, 76
Highway Abutting on River : Subsidence, 113
Highway : Obstruction, 19
Highway Passing Under Railway Bridge, 34
New Street, Laying-out, 7
New Street : Power of Local Authority to Vary Termination, 34
Obstruction on Highway : Landslip, 305
Party Walls, 19
Private Street Works, 91, 149
Projection from Building Over Footpath : Bay Window, 161
Public Footpath Across Railway, 91
Public Well : Powers of Rural District Council, 284
Refuse Removal : Trade Refuse, 149
Repair of Footbridges, 113
Repair of Retaining Wall Supporting Road, 235
Retaining Wall, 76
River Bank, Responsibility for Upkeep of, 187
Roadside Ditch, 305
Sewer Construction, 68
Surface-water Sewers : Right to Discharge into Stream, 149
Temporary Buildings, 7, 113
Vacancy on Urban District Council, 187
Water Supply, 7
Water Supply to Isolated Houses, 235
Lighting, Economy in Street, 56
Lighting of Road Obstructions, 311
Light Railways, Future of, 218
Lincoln, Municipal Engineering Work at, 117
Loans to Local Authorities, 207
Local Authorities and the Disabled, 121
Local Government Board, Annual Report of, 207
London, Housing in Greater, 205
London's Water, 92, 206, 222

LOWER THAMES VALLEY DISTRICT SURVEYORS' ASSOCIATION :—
Presentation to Mr. C. H. Cooper, 10

M

Maidstone Light Railways 82
Maidstone Public Baths, 91
Maidstone, Sewage Disposal at, 74
Maintenance of Roads in Rural Areas, 152, 162
Manchester College of Technology, 110
Materials & Construction in Housing Schemes, 77

MECHANICAL TRACTION :—
Change from Horse to Motor, 246
Commercial Motor Users' Association, 5
Consett, 212
Departmental Committee's Report, 289, 291, 301
Derby Steam Wagon Costs, 259
Dover, 269
Driving Rules, 306
Dundee, 258
Economy of Motor Vehicles, 258
Electric Vehicle Costs, 149, 235, 258
"Elgin" Sweeper, 234
Finsbury's Motor Sweeper, 29
Future of Heavy Motor Traffic, 5
Gas Traction, 159, 212, 235
Germany, 235
Gully Cleansing Machines, 226, 284
Hull's Haulage Wagons and Sweepers, 306
Kent Haulage Costs, 258
Motor Omnibuses and the Roads, 2
Nottinghamshire's Steam Wagons, 187
Questions for Local Authorities, 234
Questions of Design, 269
Straker-Squire Vehicles, 70, 112
Street-cleansing Machines, 284
Traction Engine and Heavy Motor Car Traffic, 289, 291, 301
When Municipal Motors Pay, 259
Metric System, 227
Microscopic Organisms in Water Supplies, Control of, 2
Middlesbrough Public Works, 150, 160
Middlesex Roads, 62
Middlesex Sewage Effluents, 70
Military Road Works in France, 219, 231
Ministry of Health, Engineers and the, 49
Ministry of Health, Royal Sanitary Institute and, 215

MINUTES OF PROCEEDINGS :—
Aberystwyth Council and the Office of Surveyor, 193
Afforestation, 181
Air-Raid Damage, 133
Allotments and Piggeries, 278
America and New Zealand, Road Problems in, 37
Assistant Surveyor, Rural Council and, 217
Birmingham Arterial Roads, 13
By-law Reform, 85, 289, 301
Cardiff Municipal Strike, The, 1
Cinder Screening at Destructors, 289
Comparative Road Costs, 145
Concrete Aggregates, 25
Concrete Institute, The, 277
Concrete, Proportions for, 206
Corrugation, 74
Cottage Building and Red Tape, 301
Dangerous Places near Highways, 133, 145
Demobilisation, 241
Destructors, Cinder-Screening at, 289
Dirt Problem, The, 49
Disabled, Local Authorities and the, 121
Dry Rot, Wood Construction and, 97
Dublin, Housing in, 229
Dublin's Housing Requirements, 85
Dublin's Refuse Disposal Problem, 253
Engineering Education, 1
English Public Health Administration, 145
Extraordinary Traffic Again, 85
Engineers and the Ministry of Health, 49
Fire Brigade Areas, Special, 62
Fire Brigades and Fire Prevention, 97
Footbridges, The Repair of, 73
France, A Voice from, 181
France, Roads in, 217
Fuel Rationing, 37
Greater London, Housing in, 205

MINUTES OF PROCEEDINGS (*continued*) :—
Government Building Contracts, 109, 122
Heavy Motor-Traffic, 289, 301
Highway Administration, Reform of, 73
Highways, Dangerous Places near, 133, 145
Holborn Meeting, The, 277
House Planning in Scotland, 253
Housing aud Private Enterprise, 133
Housing and Reconstruction, 121
Housing and State Aid, 13
Housing Bill, A New, 194
Housiug Bonds, 25
Housing in Dublin, 229
Housing in Greater London, 205
Housing, Labour and, 109
Housing Points, 217
Housing Registries, 157
Housing Sites and Materials, 13
Housing, The Local Government Board, and, 253
Institution of Municipal Engineers, 169
Invalid By-laws, 157, 169
Ireland, Salaries in, 37, 241
Jerusalem's New Water Supply, 73
Joint Roads Committee, The, 182
Kilkenny, Assistant County Surveyorship of, 61
Labour and Housing, 109
Land Acquisition, 277
Legal Decisions, Recent, 37
Light Railways, The Future of, 218
Loans for Municipal Undertakiugs, 277
Local Authorities and their Officials, 253
Local Government Board, 1817, The, 18, 205
London's Water, 242
Lowestoft Town Council and War-Time Damage, 181
Ministry of Health, Engineers and the, 49
Misfeasance, The Doctrine of, 109
Motors and Road Construction, 217
Motor Trunk Road Scheme, A, 229
Municipal Corporation's Right to Damages, 205
Municipal Undertakings, Loans for, 277
National Kitchens, 158
National Salvage, 97
Novel Contention, A, 1
Officials, Local Authorities and their, 253
Peace at Last, 229
Private Enterprise, Housing and, 133
Public Utility Societies, 301
Reconstrucion, Problems of, 109
Reconstruction, Town Planning and, 205
Reigate's Timber-Built Houses, 133
Road Board The, 121
Road Builders, War Spirit of the, 25
Road Construction, Motors and, 217
Road Problems, 265
Road Problems in America and New Zealand, 37
Roads After the War, 61
Roads and Bridges Control, 13
Roads and Victory, 241
Roadside Timber, A Use for, 122
Roads in France, 217
Roads, The War and, 49
Road-Tarring Case, A, 157
Rural Road Maintenance, 49
Salaries, 134
Salaries in Ireland, 37
Scotland, House Planning in, 253
Scotland, Public Health in, 145
Sewage Disposal, 61, 193
Sewerage and Typhoid, 158
Sheffield, Undesirable Housing in, 25
State Housing Scheme, The, 217
Street Building Lines, 265
Street Cleaning and Refuse Disposal, 253
Superannuation, 229
Surveyors' Institution, The, 241
Tarred Slag for Roads, 170
Technical Education, 110
Technical Point, A, 73
Town Planning, 1
Town Planning and Reconstruction, 205
Transport, War Roads and, 289
Trunk Roads, The Proposed, 241
Union, 169
War and Roads, The, 49
War Roads and Transport, 289
War-Time Damage, Lowestoft Town Council and, 181
Waste Departmentally, Dealing with, 265
Water Engineers and the Whitley Report, 25
Water Supply and National Control, 181
Welsh Agriculture, 85
Wood Construction and Dry Rot, 97
Misfeasance, Doctrine of, 109
Motor Omnibuses and the Roads, 2
Municipal Cottages, 29
Municipal Machine Shop, Efficiency of the, 251
Municipal Officials' Demands, London, 280
Municipal Piggeries, 35
Municipal Tramways Association, 167
Municipal Undertakings and Industrial Councils, 68

N

National Control of Watersheds, 171, 181
National Kitchens, 50, 158, 170, 282
National Kitchens in Villages, 129
Northamptonshire Roads, 64
Northern Road Material Agents and Merchants, 86

O

Officials and the Housing, Town Planning, &c., Act, 6
Organising a Refuse Collection Department, 281, 283

P

Paper Saving, Local Authorities and, 130
Papers, Subject-Matters for, 167
Patching of Wood-Paved Roads, 278
Peace, 229
Petrol Tax, Road Control and the, 199
Philosophy of Sewage Irrigation, 146
Pig-Keeping at Lewisham, 183
Points in Town Planning, 135, 232, 260
Presentation to Mr. C. H. Cooper, 10
Private Enterprise in Housing, 128, 133
Public Appointments and Military Service, 62, 110

PUBLICATIONS :—
Aquatic Microscopy for Beginners, or Common Objects from the Pouds and Ditches, 100
Coast Erosion and Protection, 203
From War to Work, 82
Knight's Local Government Reports, 30
Map Work, 68
Memoir of the Geological Survey, England and Wales: The Water Supply of Essex from Underground Sources, 312
Mensuration Made Easy; or the Decimal System for the Million, 100
Rural Water Supplies and Purification, 43
Sterling's Decimal Coinage, 92
Tables of Safe Loads on Steel Pillars, 68
Temporary and Semi-Permanent Water Supplies, 233
Where the Great City Stands, 30
Public Utility Societies, 154, 177, 271, 301

Q

Quarry Managers' Association, 159
Queensland, Town Planning in, 266

R

Random Notes on Roads, Traffic and Improvements, 27
Reconstruction, Problems of, 109
Road Water Supply, 268

REFUSE COLLECTION AND DISPOSAL :—
Bundling Press, 108
Children and Salvage, 90
Cinder-Screening at Destructors, 289
Collection of Organic Waste, 230
Disposal of Old Tins, 82
Dover Refuse Collection Costs, 269
Dublin's Problem, 253
Finsbury's Motor Sweeper, 28
German Methods, 99
Hornsey Metal Salving Process, 14
Marylebone, 281, 283
Municipal Salvage, 111, 127
National Salvage, 47, 97, 151, 164
Organising a Refuse Department, 281, 283
Paper Saving, 130
Possibilities of Salvage, 99
Provision of Dustbins, 158
Separate Collections, 127
Utilisation of Damaged Foodstuffs, 250
Utilisation of Garbage in America, 208
Worthing Electrics, 38
Regional Planniug, 197
Reigate's Timber-Built Houses, 133
Repair of Footbridges, 73

ROADS AND STREETS :—
Aberdeenshire, 56
Alignment of Roman Roads, 163
Army aud Highway By-laws, 19
A Road Board Appointment, 14
Arterial Road Schemes, 122
Asphalt Construction in Rainy Weather, 184
Auckland, 30
Berkshire, 106
Birmingham Arterial Roads Improvement, 13, 200
Bituminous Carpet Work, 39
Building Lines, 27, 265
Comparative Road Costs, 145
Concrete Highway Bridge Design, 8
Concrete Roads, 30, 63, 122, 140, 195, 266, 274
Control of Roads, 52, 67, 74, 75, 182
County Council and Road Damage, 117
Cornwall, 196
Corrugation, 270
Damage by Timber Haulage, 250
Dangerous Places Near Highways, 133, 145
Essex, 54
Extraordinary Traffic, 85
Finsbury's Motor Sweeper, 28
Future of Light Railways, 218
Government Grants, 290
Granite Chippings and Cyclists, 50
Granolithic Paving, 74
Gravel Heaps on Roadsides, 188
Hailsham Rural, 12
Holborn, 278
Hong Kong, 208
Housing and Roads, 283
Improved Road-Washing Machine, 112
Isle of Ely Maintenance Costs, 251
Johannesburg, 214
Joint Roads Committee, 182
Kent, 63
Kent Maintenance Costs, 248
Law Affecting Public Highways, 158
Life of Road Coatings, 27
Maidstone, 74
Maintenance Defined, 230
Maintenance in Rural Areas, 152, 162
Middlesex Roads, 62
Military Road Works in France, 219, 231
Motor Omnibuses and the Roads, 2
Motor Vehicles and Road Construction, 221
Natal, 143
Northamptonshire, 64
Northern Road Material Agents and Merchants, 86
Nottinghamshire, 188
Patching of Wood-Paved Roads, 278
Random Notes, 27, 41
Renewal and Maintenance Grants, 290
Repair of Footbridges, 73
Road Board Annual Report, 121, 122, 126
Road Control and the Petrol Tax, 199
Road Material Agents and Merchants, 58
Roadmen's Holidays, 247
Road Tarring Case, 157
Roads and Victory, 241
Roads During and After the War, 44, 49, 54, 59, 61, 63, 65, 75, 83, 86
Rural Council's Respousibility for Road Accident, 50
Rural Road Maintenance, 49
Street Wateriug, 28
Stretford, 51
"Safety First," 13, 115
Structure of Road Surfaces, 267
Tar-Macadam *v.* Tarred Slag, 159, 170, 194
Tarring and Team Labour Costs, 224
Tar Distribution under Permits, 126
Tar-Spraying, 14
The Labour Companies, 159
Traffic and its Effects, 27
Trees in Streets, 254
Trenchings, 27
United States Highway Council, 112
Use of Roadside Timber, 122, 156
War Prisoners as Road Makers, 98
War Spirit of the Road Builders, 25
Warwickshire, 224
Wayne Concrete Roads, 140
Widenings and Improvements, 28
Wolverhampton, 39, 41
Woman as Highway Superintendent, 267
Women as Road Sweepers, 91
Women Scavengers, 170
Women Tar-Sprayers at Westminster, 8
Worcestershire, 98
Roman Roads, Alignment of, 163

ROYAL SANITARY INSTITUTE :—
Swindon Meeting, 245
Rural Council's Responsibility for Road Accident, 50

S

"Safety First," 13, 156
Salaries, 37, 38, 83, 91, 98, 134, 181, 241
Salvage, 47, 97, 111, 127, 151, 164
Salvage aud Utilisation of Waste, Possibilities of, 99
Sand Filters, Theory of Action of, 74
Sanitary Inspectors and Trade Unionism, 142
Sanitation After the War, 124
Scotland, Public Health in, 145
Scottish Drainage Regulations, 110

SEWERAGE AND SEWAGE DISPOSAL :—
Activated Sludge Process, 131
American Research Work, 56
Belfast Sewage Contract Annulled, 14
Camp Drainage and Sanitation, 55, 245
Combined or Separate Sewerage Systems, 206
Control of Small Works, 183
Design of Plants, 55
Disposal, 55, 61, 66
Ensuring Efficieucy in New Jersey, 259
Fertilisers from Sewage, 55, 58
Fertiliser Value of Sludge, 103
Johannesburg, 233
Maidstone, 74
Middlesex Effluents, 70
Philosophy of Sewage Irrigation, 146
River Pollution in Staffordshire, 244
St. Albans, 131
Scottish Drainage Regulations, 110
Shanghai, 255
Sludge Disposal, 293, 308
Stretford, 51
Two Sludge Problems, 195
Warwick Works, 147
West Riding, 304
Wolverhampton Experiments, 55
Shanghai, Sewage Disposal and Water Supply at, 255
Sheffield, Undesirable Housing at, 25
Shop Window Blinds, Projecting, 83
Sludge Disposal, 293, 308
Sludge, Fertiliser Value of, 103
Sludge Problems, 195
Southampton Docks, Concrete Road in, 266
South Wales Sanitary Inspectors, 117
Sowerby Bridge Municipal Piggery, 19
Stretford Public Works, 51, 53
Structure of Road Surfaces, 267
Subject-Matters for Papers, 167
Superannuation, 193, 194, 229, 230, 268

SURVEYORS' INSTITUTION :—
Jubilee, 241

T

Tar Distribution under Permits, 126
Tar-Macadam *v.* Granite-Macadam, 220
Tar-Macadam *v.* Tarred Slag, 159, 170, 194
Things One Would Like to Know, 5, 17, 35, 40, 56, 67, 84, 91, 107, 117, 129, 139, 156, 161, 175, 185, 203, 214, 222, 233, 247, 259, 273, 295, 307

TOWN PLANNING INSTITUTE :—
Meetings, 2, 223, 236
Training of Engineers, 1, 3, 18, 31, 279, 302
Trees, Dangerous, 269
Tudor Waters Report on Housing, 243
Two Sludge Problems, 195

U

Undesirable Housing at Sheffield, 25
United States Highway Council, 112
University of Liverpool Department of Civic Design, 187
Use for Roadside Timber, 122, 156
Utilisation of Garbage, 208

V

Vermin, Extermination of, 307
Victory, Roads and, 241
Village National Kitchens, 129

W

Wandsworth National Kitchens, 50

WAR :—
Air-Raid Damage to Public Works, 132, 133, 247
Army and Highway By-laws, 19
Bonuses, 26, 54, 170, 310
Conscientious Objectors, 198
Engineer in War, 218
Firemen and Military Service, 38
Local Authorities and the Disabled, 121
Military Road Works in France, 219
Prisoners as Road Makers, 98
Tribunals, 88, 220
War and Sanitation, 134
Warwick Sewage Works, 147
Warwickshire Road Costs, 224

WATER :—
Aberdeen, 182
Ashton-under-Lyne, Stalybridge, and Dukinfield District, 222
Benefits of Covered Reservoirs, 182
Bombay Storage Lakes, 242

WATER (*continued*) :—
British Waterworks Association, 170, 215
Consumption in Canada, 175
Control of Microscopic Organisms, 2
Corrosion of Cast-iron Mains, 4
Empire Water Power, 90
Jerusalem's New Supply, 73
London, 92, 206, 222
National Control of Watersheds, 171
Rand, 268
Reinforced Concrete Mains, 268
Repair of High-Pressure Main, 29
Shanghai, 255
Theory of Action of Sand Filters, 74
Water Engineers and the Whitley Report, 25
Whitley Council for Water Undertakings, 149
Window Cleaning Dangers, 22
Wolverhampton, Road Construction at, 39
Wolverton, Municipal Engineers at, 26
Woman as Highway Superintendent, 267
Women and Engineering Work, 88
Women and Internal Planning, 139, 185, 253, 256
Women as Road Sweepers, 91
Women Tar-Sprayers at Westminster, 8
Wood Construction and Dry Rot, 97
Worcestershire, Road Maintenance in, 98
Worthing, House Refuse Collection at, 38

AUTHORS OF PAPERS, ARTICLES AND ADDRESSES.

Allcock, H., 227
Barralet, T. C., 87
Beswick, W. H., 245
Booth, E. W., 37
Bower, T. B., 278
Brown, R., 174
Bunting, T. F., 74
Burgess, S. E., 150
Burton, W. E. H., 77
Campbell, A. H., 135
Chapman, H. T., 63
Cockrill, J. W., 6
Craig, J., 146
Crompton, R. E. B., 5
Crowter, G., 74
Currie, D., 99
Dawes, J. C., 111, 127
Dryland, A., 27
Eade, J., 131
Eccles, W. H., 101
Edmonson, J. H., 183
Edwards, L. N., 209
Freeman, A. C., 29
Gair, J., 281
Green, G., 39
Haine, W., 2
Hambleton, F. T., 293, 308
Henzell, C. G., 171
Hooley, E. P., 59
Houfton, P. B. H., 223, 236
Jenkins, D. M., 197
Jenkinson, W., 159
Jones, E. W., 220
Leeming, E. L., 270
McKay, G. P., 103
MacLean, W. A., 221
Mansfield, F., 89
Marriott, T. G., 184
Martin, A. J., 195
Morris, C. S., 64
Moynan, J. O., 230
Nasmith, G. R., 103
Rees Jeffreys, W., 2, 44
Nicholson, F., 199
Pardoe, J. C., 186
Parr, F., 137
Salkield, T., 219, 231
Silcock, E. J., 3
Spurr, F. W., 15
Stilgoe, H. E., 110, 200, 211
Taylor, W. H., 114
Wakelam, H. T., 62
Webb, J. A., 152, 162
Wentworth-Sheilds, F. E., 266
Whyte, W. E., 158
Willcox, E., 55, 66
Wood, F., 267
Worrall, E., 51
Wyand, B., 172

ILLUSTRATIONS.

B

Barimar Repair Work, An Example of, 251

D

Dumore Hold-Open Sack Supporter, 178

E

"Elgin" Motor Road Cleaner, 234

G

Green's Motor Street Sweeper at Hull, 306
Guest's Improved Bundling Press, 108

K

Karyton-Eros Adaptor and Tipping Body, 259

M

Matthews' Portable Hot-Air Disinfestation Chamber, 307
Municipal Cottages, New Types of, 29

P

Portraits :—
Brown, R., 174
Page, Logan Waller, The Late, 297

S

Sewage Disposal at Warwick, 147, 148
Scottish Housing Type Plans, 123, 124, 125, 126
Straker-Squire Gully-Emptying Machine, 284
Straker-Squire Motors, A Fleet of, 70
Straker-Squire's Latest Road-Washing Machine, 112
Straker-Squire's Street Washer, 284

T

Tip-up Baths, 154

W

Warwick, Sewage Disposal at, 147, 148
Window-Cleaning Dangers, 22
Women Labourers Tar-Spraying at Westminster, 8

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Town Planning.

The papers which were submitted at the Town Planning Conference held in connection with the recent annual meeting of the Institution of Municipal and County Engineers covered a very wide field. First, Mr. A. H. Campbell, under the title, "Points Arising in the Pursuit of Town Planning," dealt with what we may call progressive town planning, his theme being that the same area of land may be the subject of two or more successive schemes, the later ones dealing with the development in detail of the broad plan comprised in the first. In this connection it is interesting to observe that the Scottish Local Government Board have taken the opinion of the Law Officers of the Crown on three important legal questions, all of which were answered in the affirmative. From this opinion it appears that after the board have granted authority to a local authority to prepare a town-planning scheme for a certain area, it is competent for the board, (*a*) with the concurrence of the local authorities interested, or (*b*) without such concurrence, to give their approval to a scheme dealing with an area smaller than that for which the authority to prepare a scheme was granted. Further, it is competent for the board, in granting approval to a town-planning scheme, to grant approval of a part of the scheme affecting only part of the area included, and to hold up the remaining part for subsequent consideration and approval. Finally, the powers of elasticity and modification are sufficiently wide to admit of the insertion in a scheme of provisions which, while they deal specifically with such important matters as, *e.g.*, the delimitation of land units, the prescription of a minimum building line, the allocation of areas for residential and industrial purposes respectively, the maximum heights of different kinds of buildings, at the same time reserve to the responsible authority, under suitable control by the board for the protection of all concerned, the power to issue orders prescribing, in conformity with and within the limit of the terms of provisions of the scheme affecting these areas, such complementary details as the average number of houses in any specified land unit or part thereof, the building line of any particular street, the character and height of buildings in any defined area. Among the specific proposals made by Mr. Campbell, which met with general approval in the subsequent discussion, were the simplification of the preliminary procedure, the passing of legislation to bring all undeveloped building sites in urban areas within the operation of the Town Planning Act without the necessity of establishing in relation to them a "*primâ facie* case," and the application of the Act to the clearance and reconstruction of overbuilt and badly developed city sites. Mr. Cockrill, in the course of a paper which he contributed in lieu of one which was to have been read by the late Mr. J. S. Brodie, paid a well-deserved tribute to the pioneer work of the Birmingham and Ruislip-Northwood authorities; while Mr. D. M. Jenkins dealt with Regional Planning, particularly as applied to the hill districts of South Wales. We hope to say more as to these papers on a future occasion, and also to deal with the very valuable contribution of Mr. H. E. Stilgoe, who dealt at length with the City of Birmingham Arterial Roads Scheme.

* * * *

Engineering Education.

The whole question of technical education, in all its aspects, is of such vital importance in view of international competition after the war, that the Institution of Water Engineers were perfectly justified in devoting part of their annual summer meeting to a discussion on the training of engineers. The subject was introduced by Mr. E. J. Silcock in an address the merits of which we fully appreciate, although we are unable to agree with all the conclusions arrived at. Mr. Silcock dealt first with the general professional education of civil engineers, and secondly with the question of specialised training for waterworks engineers. Generally, for every branch of civil engineering practice, Mr. Silcock advocated—(1) A good general education at a public school; (2) two years' theoretical training at a university; (3) three years' pupilage with a civil engineer in active practice. It will at once be observed that these proposals involve a reduction in the ordinary university course from three years to two years, a reduction which it is suggested might be made good by a longer working day and greatly reduced vacations. Indeed, Mr. Silcock goes so far as to say that ordinary office hours should be adhered to for the university course. In our view, however, this would be quite impracticable, as to expect a student, whose mind is always taking in new matter, to apply himself for the same hours as an office assistant would be bad economy, if not positively dangerous to health. As regards special training for waterworks engineers, we observe with particular interest the proposal that was made for the institution of a special diploma. Indeed, the Joint Committee on the Status of Water Engineers have already unanimously resolved to invite the council of the Institution of Water Engineers to consider the advisability of establishing a standard examination for water engineers. Such a step would be welcome, provided that it is made clear that the diploma is supplemental to and not in substitution for the general training which should be behind civil engineers of all branches of the profession.

* * * *

The Cardiff Municipal Strike.

The state into which Cardiff is relapsing through the strike of municipal employees seems to be extremely regrettable, all the more so as there is at least evidence that it might have been avoided. The strike has lasted for a fortnight, and great inconvenience has been caused by the non-collection of the city refuse, which is accumulating to a somewhat serious extent. This is, of course, the most lamentable feature of the episode, as it is obvious that such accumulations in a crowded city are a grave menace to the public health. It is certainly a matter of surprise as well as regret that in consequence of bungling somewhere a requisition to the Lord Mayor asking that a special meeting should be convened to consider the matter and decide upon a course of action has been allowed to remain in abeyance so that ten days of valuable time have been lost, with the result that things have gone from bad to worse. The Lord Mayor was absent when the requisition was presented, and on being interrogated he had to confess that he "believed the requisition was in the hands of Mr. Cornish, chief committee clerk." However belated the effort may be, there is at least some satisfaction in knowing that the city council on Monday last met and invited the men on strike to go back to work forthwith on the understanding that the Wages Committee be called together to meet the representatives of the employees and discuss the points at issue, and, failing an agreement, that the matter be referred to an independent arbitrator. This is clearly the course that ought to have been taken in the first instance when the issue became acute. It is the one dictated by common sense where disputes arise which threaten to be mischievous to the public health, and it is to be hoped that such counsels will prevail at Cardiff as will save the city from further prolongation of a situation that is too perilous to temporise with.

* * * *

A Novel Contention.

We observe with satisfaction that at the last meeting of the Belchamp Rural District Council the surveyor (Mr. S. Allpress) was warmly complimented upon having secured a very satisfactory settlement of the council's claim in a case of extraordinary traffic. The claim arose out of the haulage of timber over country roads by means of traction engines, and it was resisted upon the rather novel ground that as rates had been paid in respect of the land from which the trees were cut there was no liability for damage done to the roads by their haulage. We need hardly say that there is no authority in law for such a proposition. Indeed, the

whole subject of extraordinary traffic has been discussed in its legal aspect in so many cases that the essential simplicity of the law is apt to be overlooked. Extraordinary traffic is in no sense unlawful in itself, but once it is established that traffic is "extraordinary" the highway authority have a statutory right to recover the expenses of making good the damage done. This right can certainly not be affected in any way by the fact that rates have or have not been paid upon the land from which the goods are drawn. Mr. Allpress succeeded in obtaining a settlement in full of the council's claim, his special services being recognised by the grant of an honorarium.

CONTROL OF MICROSCOPIC ORGANISMS IN WATER SUPPLIES.*

By Wm. Haine.

Without going into a detailed study of the problem, it may be said that all surface water supplies are more or less susceptible to growths of microscopic organisms, but the optimum conditions for their development are to be found in lakes and reservoirs rather than in running streams. The chief difficulties arising from the presence of these organisms are the tastes and odours which they impart to the water. In order to prevent these tastes and odours, many remedies have been suggested and tried, but prior to the use of copper sulphate none has given general satisfaction. By covering filtered water reservoirs, algæ troubles have been eliminated in the case of filtration plants. This method, however, cannot be used for large reservoirs.

The copper sulphate treatment is now recognised as a standard procedure in waterworks operation, and is simple, consisting essentially of placing weighted quantities of copper sulphate in loosely woven bags and dragging them from the stern of a motor boat. This is preferable to a rowboat, since the movement of the propeller assists materially in spreading the chemical evenly over the surface of the water.

While the services of a technically trained man are not necessarily required for this phase of the work, it is essential that some judgment be used in determining the rate of solution from the bags and controlling the amounts of chemical dissolved in the various parts of the reservoir, in order to get the best distribution. It has been the writer's experience that better results are obtained if slightly larger quantities of the chemical are added to the shallow areas, as the heaviest growths are most frequently found in these localities.

As the amount of chemical required for successful treatment of a supply depends in a large measure upon the types of organisms present, it is necessary to know what types we are dealing with, since some of them are more susceptible to the action of copper sulphate than others. We have found that most uniformly successful results are obtained when the amount of chemical is determined on the basis of the most resistant types of odour-producing organisms in the supply. If the dosage is sufficient to kill the more resistant forms, secondary growths develop which also produce trouble. Scientific studies of the amount of copper sulphate necessary for killing various organisms may be found in the literature on this subject, and the results of practical treatment coincide very closely with the figures thus recorded.

In this connection the most common mistake of the waterworks man is to defer action until the growths have developed to such an extent that the consumers object. The treatment produces best results when used as a preventive measure rather than as a cure; therefore it is highly advisable to treat promptly at the first sign of a decided increase of odour-producing algæ. This information can be obtained only by microscopic examinations made at regular intervals, especially during the time when trouble is to be expected. In this way the odour-producing organisms are detected at their first appearance, and prompt treatment destroys them before the consumers are aware of any possible difficulty. Although the method is undoubtedly efficient under proper control, it cannot be emphasised too strongly that a definite knowledge of the condition of the reservoir is always required if uniformly successful results are to be obtained.

In some instances, subsequent to the treatment of a supply, large numbers of fish have died, and for this reason numerous researches have been carried out to determine the tolerance of various types of fish to copper sulphate. It has been shown that trout can be killed with ·14 parts per million of copper sulphate, while black bass are able to withstand up to 2·10 parts per million, and other species range between these limits.

A phase of the problem that has not been emphasised, however, is the effect of the reduction of the dissolved oxygen in the water following copper sulphate treatment. Laboratory tests of water after treatment show a material reduction in the number and types of algæ with rapid increases in the number of bacteria, and accompanying these changes the dissolved oxygen in the water is very materially reduced. This change is due to the bacterial activity involving the oxidation of decomposing algæ growths.

Our records, covering a great many copper sulphate treatments, show that there has been no destruction of fish life in the cases where the treatment was given before the growths had developed to any great extent. In many cases the amount of copper sulphate used was greater than that given in the literature as sufficient to kill certain types of fish which were present. In the writer's opinion, in many instances where large numbers of fish have been killed following copper sulphate treatment, the difficulty has been due to the sudden destruction of large volumes of vegetable growths rather than to any direct poisonous effects of the chemical.

It has been asserted that anything which would destroy fish would be harmful to man, and there are some who object to the treatment on these grounds. Authorities are agreed, however, that copper sulphate as it is ordinarily applied in ridding supplies of microscopic organisms does not endanger public health. The fact that many cities have been getting relief for a number of years by the use of the treatment without any evident adverse effects is a good indication that the method is not a dangerous one and merits the attention of any municipality where objectionable types of algæ exists in the water supply.

*From a paper read before the New England Waterworks Association.

MOTOR OMNIBUSES AND THE ROADS.

By W. Rees Jeffreys,
Secretary of the Road Board.*

A local tax on the mileage run by motor 'buses does not provide local authorities with the capital funds they require to reconstruct roads in suitable materials for motor-'bus traffic in advance of such traffic.

As compared with a rough macadam road frequently under repair, a modern smooth surface road reduces the running costs of a motor-'bus service. The operating companies and authorities may fairly be asked to make a contribution towards the capital cost of providing such roads, provided they have some voice in the administration of the funds they supply and are not called upon to contribute to subsequent cost of maintenance, and their contribution is not used to relieve the annual burden which has previously been borne by the local authority.

What private companies and local authorities operating 'buses desire is:—(*a*) Freedom from vexatious and varying regulations and charges locally imposed; (*b*) Freedom from demands for extraordinary traffic damages; (*c*) Good roads on which their vehicles may run with a minimum of wear and tear.

What the local authorities require is the capital funds which will enable them to reconstruct the roads before the motor-'bus traffic is placed upon them, so that the subsequent cost of maintenance shall not exceed the sums in respect of maintenance previously spent by the responsible authority.

The problem is to meet the views of the highway authorities on the one hand and the companies, persons and authorities operating motor 'buses on the other.

The payment of a mileage rate does not give the local authorities what they really in most cases require—namely, the capital sum to reconstruct the road in suitable materials before the traffic is placed upon it.

PROPOSALS.

That a tax of (say) *x*d. per mile run in London and county boroughs and (say) *y*d. per mile run in the rest of the administrative counties shall be paid by the operating companies and authorities to a central authority.

The money so collected shall form a sinking fund to raise a capital sum, which shall be used for the reconstruction of roads on which it is desired to establish motor-'bus routes.

That this fund shall be administered by the central authority advised by a committee, upon which highway authorities and motor'-bus operating companies and authorities shall be equally represented.

That the central authority thus advised shall select the roads which shall be reconstructed at the expense of the central fund, and until such roads have been reconstructed an intensive motor-'bus service—*i.e.*, more than one motor 'bus per hour each way—shall not be run.

Whether a road as at present constructed is capable of sustaining an intensive motor-'bus service shall be decided by the central authority, if the local authority and the local operating company or authority are unable to agree upon this point.

That operating companies and authorities paying the mileage rate and running 'buses on reconstructed roads, or on roads as at present constructed with the approval of the local authority or the central authority, shall not be liable to claims for extraordinary traffic damages.

* From a paper entitled "Some Administrative Problems," presented at the annual meeting of the Town Planning Institute.

The Training of Engineers.*

By E. J. SILCOCK, M.INST.C.E., F.G.S.

The above title does not indicate the whole field which it is proposed to cover in this discussion. Obviously the training of water engineers can only be considered in relation to the more general question of the education of all civil engineers as distinguished from mechanical manufacturing engineers.

It is proposed to consider the subject under two heads: first, the broader question of the education of civil engineers; and second, the amount of specialisation necessary for those who intend to practise as waterworks engineers.

In the first branch of the subject the writer confines himself to the training of civil engineers who are intending to practise as consulting, official or executive engineers in connection with railways, harbours, docks, canals, waterworks, sewerage, gasworks, municipal engineering and mining. It is submitted that these branches of the profession should be separately considered and provided for, and should not be included in the mechanical and electrical branches.

Hitherto the engineering departments of the British universities and technical schools have endeavoured to make their courses cover all sections of engineering, but there has been a general tendency to make the mechanical side predominant. This no doubt arises from two causes—viz., first, the number of students intended for mechanical work is larger than that of those intending to follow civil engineering; and, second, mechanical engineers have, as a body, been more liberal in their financial support of the modern universities and schools, and have therefore quite rightly been more largely represented than their civil engineer confrères on the governing bodies who appoint the teaching staffs and direct the courses of study.

EARLY TRAINING.

The general sequence of the training of a youth intended to follow the profession of civil engineering should, in my opinion, consist of:—

(1) A good general education at a public school.
(2) Education at a university in the theoretical side of the profession for a period of two years.
(3) An apprenticeship for a period of three years with a civil engineer in active practice.

Dealing with these in the order named: the public school selected should be one having a good "modern side." This is most important. Most public schools still cling to the old idea of a classical education with a modern side as a "side show" and to it are relegated many of the incompetents from the "classical side," together with a few brilliant boys who have gained scholarships but who are intended for a commercial career.

For a boy to be successful as a civil engineer he must have a good general education and, whilst agreeing that Latin and Greek should not be excluded in his early school years, it is in my opinion imperative that those two subjects should be dropped during the last year or two of the boy's school life and his whole energies for that period concentrated on natural science, mathematics (which should be continued at least to include the calculus and the solution of triangles) and two modern languages.

With regard to age limits, it is suggested that the boy should be sent to a good preparatory school at the age of eight or nine, and that the public school training should begin when he is about twelve years old and should continue until he is about seventeen years of age. He should then be capable of passing a matriculation examination at a university.

TECHNICAL THEORETICAL TRAINING.

Turning to the technical theoretical training at a university, it is submitted with some confidence that a period of two years should be sufficient to give an average youth a good grounding in the general principles of the subject which are likely to be of use to him in his profession, but this will involve a radical alteration in the system of education at present in vogue. To begin with, the time actually occupied in attending lectures, laboratory work, private study, and preparation of work must be considerably increased. The youth, who would now be over seventeen years old, and at an age when, if not still at college, he would be going to work, must be taught to regard himself as no longer a schoolboy, but a man who has really commenced his life's work, just as much as if he were in an office. To this end ordinary office hours of 9 a.m. to 5.30 p.m. (with an hour for lunch five days a week, and 9.30 a.m. to 1 p.m. on Saturdays), should be kept, and strict punctuality and regular attendance should be observed and insisted upon. Evening work of preparation or writing up notes should be imposed at times as a form of overtime, but need not be a regular requirement. The holiday periods would have to be very substantially reduced and brought more into line with the time given to youths in offices. Probably a month in the summer, with a week at Christmas and Easter respectively would be as much time as could be spared if the necessary work is to be accomplished. Further, the time occupied in examinations should be cut down to a minimum, and it is suggested that the course of instruction may well include, as a prominent feature, test-papers on the various subjects taught. This would effect a twofold object—viz., to train students to express their knowledge in writing, and, at the same time, enable the teaching staff to ascertain what progress had been made. By adopting such methods it would not be necessary to hold more than two formal examinations during the course, and these should be of not more than a week each in duration. One such examination should be conducted by the university staff at the end of the first year and the other by examiners appointed by the Institution of Civil Engineers at the completion of the course. The latter body might, with advantage, divide the associate-membership examination into two parts, one theoretical and the other practical. The student should be capable of passing the theoretical part of the examination at the end of his two years' college course.

SCOPE OF THEORETICAL INSTRUCTION.

The scope of the theoretical instruction should cover, *inter alia*, the following subjects:—

(1) Chemistry. Elementary, as affecting the materials likely to be used and to enable the student to understand a chemical analysis or formula.
(2) Physics. Elementary, to enable the student to appreciate the meaning of physical expressions.
(3) Geology, as affecting engineering with special reference to hydro-geology.
(4) Surveying instruments, their uses and adjustments.
(5) Strength of materials and methods of testing.
(6) Hydraulics—to be very fully treated.
(7) Calculations of stresses in structures and graphic methods.
(8) Dynamics.
(9) General principles applicable to various forms of prime movers.
(10) Instruction in the selection of types and testing of prime movers and machinery, with information as to the limitations of same.
(11) Transmission of power.

No attempt should be made to teach drawing; this can be better done in the office, and, in my opinion, it is unnecessary to teach the student mere manual dexterity with machine tools. The various processes which can be carried out by different types of tools and the limitations to which they are subject should be fully described and illustrated by the instructors in the laboratory, or by visits to works, but it is not imperative that the student should learn to use the machines himself.

Surveying and levelling can be better taught after leaving the university, provided the student has been instructed in the construction, use and adjustment of the principal instruments which he will have at his command and the theoretical basis on which various types of surveys are founded.

As an illustration of the sort of training required it is much more important that the student should have been instructed in the general capabilities of different types of prime movers and their application under various circumstances than that he should be able to appreciate the intricacies and the niceties of a special valve-gear, however ingenious and interesting it may be.

So far as is known, there is no university or technical school curriculum which covers the ground suggested above, and if there were it would be quite impossible to do justice to it in two years without modifying the usual time-table. On the other hand, two years is as much time as should be allotted to the theoretical part of the training, provided that it is supplemented subsequently by evening work. The addition of a third year to the practical training would be in my opinion of far more value than a third year at the university, even if that year were properly utilised. Under the system advocated it is contended that as much useful information could be acquired in two years as is now obtained in three years. The system proposed is a radical change which would upset the whole holiday arrangements of existing universities. It is probable that the number of students would not justify the establishment of many civil engineering courses

* Paper submitted in introduction of discussion at the annual summer meeting of the Institution of Water Engineers.

such as those outlined, but if three or four could be equipped at the Universities of, say, London, Birmingham, Manchester and Leeds, so that the students could share the corporate and social life of those universities, they would be more likely to succeed than would separate engineering schools such as the late Cooper's-hill establishment.

ARTICLES PERIOD.

After taking the two years' university course, the student should be articled for a period of three years to a civil engineer in practice, who should be a corporate member of the Institution of Civil Engineers. The first two years of this period should be chiefly devoted to drawing-office work, interspersed with visits to works in progress and practical field work, with qualified assistants, on surveys and levelling. Draughtsmanship is of the greatest importance and can best be acquired in an office. It is the groundwork of the designing part of the work, and is essential to the first step after completion of articles—viz., that of obtaining a footing in an office as a paid assistant. The better a man can draw and express his own and other people's ideas on paper, the better the work the pupil will be entrusted with, and the more he is likely to come in touch with his principal. During his first two years the pupil should make himself familiar with all drawings and work going on in the office and should occupy his spare time in making tracings for himself of standard drawings. Such tracings are the best means of impressing on his memory the details of construction, and would form also a valuable fund of information for reference in future years. He should also accumulate a collection of reports, specifications, tenders and bills of quantities, and in the latter should fill in the prices from two or three actual tenders. The more of these he has the better, and the greater amount of labour he puts into them in copying and filling in prices the more complete his knowledge will be.

The third year should be devoted more to out-door work, and the pupil, who should now be able to make surveys or take levels, would be entrusted with this class of work. While a pupil, he should also be sent out for short periods as assistant to a resident engineer or clerk of works. This would enable him to acquire practical knowledge of the quality of materials and workmanship, setting out, measuring up, the management of men, methods of timbering excavations, dealing with water, lifting heavy weights, testing engines and machinery, and other details of actual construction.

During the whole of the three years he should in the winter months devote at least two nights per week to attendance at continuation classes, if possible at the university at which he took his two years' course, or, failing this, at some good technical institute or school. At the end of his third year (say at the age of twenty-two) the embryo engineer should be able to earn a salary sufficient to keep him. He will have his foot firmly placed upon the first rung of the ladder, and it will depend upon himself and the way in which he takes advantage of his opportunities how far and how fast he will go in his profession.

His final step in training will be to take the second part of his associate membership examination of the Institution of Civil Engineers at the age of twenty-three or twenty-four. This examination should, in the writer's opinion, be of a more practical character than the present examination and should be partly *viva-voce* and accompanied by tests in the use of surveying instruments, engine-indicator, &c., and an exhibition of drawings, made by the candidate, of works on which he has been engaged.

SPECIALISATION.

Turning now to the more specialised subject of the training of water engineers, it is submitted that the school—and college—training previously described should be the course followed by those intending to take up water engineering, and the main point to be considered is the period in the training at which specialisation should commence. The author suggests that it is most desirable that an intending water engineer should commence to specialise immediately after he has finished his university course. He should become articled to a member of the Institution of Civil Engineers who either holds a public appointment as engineer to a waterworks undertaking, or one who, if in consulting practice, is mainly engaged in the design and construction of works of water supply. Of the two, probably the best general result would be obtained if the intending engineer were articled to an engineer holding an official position as a waterworks engineer. This would give greater insight into distribution and management of waterworks, but should, if possible, be combined with constructional work of as varied a character as possible. On the other hand, the young man who is articled to an engineer in consulting practice would probably see a greater variety of work than one articled to an official engineer and would be more likely to eventually become a designing and constructive engineer rather than adopt an official position. The relative advantages of the two methods are probably about equal, and both can be recommended.

If, however, the young engineer does not article himself to a waterworks engineer he should at least become the pupil of some engineer who is engaged in works of a similar character, such as sewerage, land drainage, irrigation, canals or dock works. After serving his time he should in this case at once endeavour to obtain an appointment in the office of an engineer of a water undertaking, in order to familiarise himself with the routine work of a waterworks engineer's practice.

A DIPLOMA ?

Connected with this subject is a further question of whether or not it is desirable that there should be a special qualification or diploma in waterworks engineering. In the writer's opinion it is desirable that such a diploma should be instituted, but it should in the first instance be looked upon as a purely voluntary test submitted to by the candidate of his own free will. It should be regarded as supplementary to, and not a substitute for, associate membership of the Institution of Civil Engineers. The case of medical officer of health may be taken as an analogy; thus, a medical man who intends to take up public health work, after obtaining his ordinary qualifications to practise in medicine and surgery, usually takes the D.P.H. qualification as a further indication that he is capable not only to act as a medical man, but is specially well qualified in public health matters. A diploma such as this has obvious advantages, one of the most important of which is that it gives the young engineer a definite goal to work for, and compels him to study more deeply than he otherwise would do the special subject in which he is interested.

If, as the result of this discussion, there is a general feeling in favour of a special diploma, it is suggested that this institution is the proper body to act as the examining authority and that it behoves the council to take steps to that end. If hereafter such a diploma became compulsory, the institution, being already in the field and equipped with suitable machinery for carrying out an examination, would most probably be accepted as the proper medium for continuing the examination and granting the statutory diplomas.

[A report of the discussion which followed the presentation of Mr. Silcock's views on this subject at the recent meeting of the Institution of Water Engineers will appear in our next issue.]

CORROSION OF CAST-IRON MAINS.

EFFECT OF GYPSUM-LADEN SOILS.

"Although the rapid corrosion of pipes when buried in certain soils is a well-known fact, the causes have not," says P. Medinger in the *Journal für Gasbeleuchtung* of February 16th, "been analysed with sufficient care." He refers to a work by himself entitled "The Rusting of Iron and its Prevention" for a general review of the subject, and then proceeds to describe the experimental work done by himself for the purpose of a report upon the corrosion of cast-iron water-mains laid only two years previously in the soil at Esch, in the Grand Duchy of Luxemburg.

The pipes had become as soft as hardwood and could be cut with a clasp-knife. An analysis of the original metal showed metallic iron 92·64 per cent, carbon 3·42 per cent, while that of the corroded pipes showed metallic iron varying from 30·5 per cent to 44·2 per cent only, and carbon 24 per cent. When the pipes were first taken up little or no rust was visible, but the iron had been changed into a powdery metallic form.

The pipes were laid in yellowish-grey heavy loam in which there was a good deal of gypsum; the loam contained 7 per cent of calcium bicarbonate and 19 per cent of water, which held in solution 2·05 gr. of calcium sulphate per litre; there was scarcely any chlorine present.

From elaborate electrical tests the author proved that a difference of potential as low as 0·5 volt produced between the carbon and the iron would cause a flow of 0·8 milliamperes through the pipe, and he attributes the rapid deterioration to the electrical action in the presence of the electrolyte formed by the solution of the salts in the soil with rain water. This solution is kept in permanent contact with the pipes owing to the retentive character of the soil.

"Monolastic" Progress.—We are informed that Highways Construction Limited have just secured further important paving contracts, the first being some 13,000 sq. yds. at Warwick-gardens, Cromwell-crescent, and part of West Cromwell-road, Kensington. On the completion of this contract, over 45,000 sq. yds. of "Monolastic" paving will have been laid for the Royal Borough. The other contracts are about 9,000 sq. yds. for the City of Westminster, the roads to be surfaced being portions of Wilton-road, Wellington-street and Long Acre, and the resurfacing of a portion of Albany-road, for the Borough of Camberwell.

THE FUTURE OF HEAVY MOTOR TRAFFIC.

By Colonel R. E. B. Crompton, c.b., m.inst.c.e.*

I feel certain that almost all serious thinkers agree with me that rapid, cheap and certain transport from port to inland town or village, or from town to town—nay, even from cottage door to factory, or from factory to cottage door—is now an acknowledged necessity and must come. The war has shown clearly, even to those who did not previously realise it, how greatly everyone's comfort, convenience and health have depended on road transport for bringing to our doors not only our food, but almost every necessity of life on which our comfort and happiness depend.

HOUSING SCHEMES AND TRANSPORT.

The possibilities of a perfect system of collection and distribution of all products, raw and manufactured, are so great, and their effect must be so far-reaching, that it is unnecessary for me here to say more than that the evils of overcrowding in our dense areas, the crowding together of factories, entailing congested, dismal and squalid workmen's living quarters, can only be overcome by removing the homes in which our workers live, rear their children, and spend their leisure hours, into garden cities or town-planned areas, where every worker can have elbow-room and enjoy his garden. These and all the schemes for re-housing our workers depend principally for success on cheap road transport.

FUEL DIFFICULTIES.

Turning now to the realities of the time—we are still at war, The supply of liquid fuel on which you have hitherto relied to drive the greater part of your vehicles is so restricted by war conditions that for some time to come you will have to look for other means of obtaining driving power. Thanks very largely to the exertions of Mr. E. S. Shrapnell-Smith, the use of gas as a power agent for traction purposes has been made possible, and is steadily extending. Later on, when war conditions permit of the manufacture and supply of cylinders and compressing plant, the use of gas-propelled vehicles will be greatly helped, and in my opinion will become permanent, even for all the lighter class of vehicles, and for short runs such as for taxis and private carriages within or near towns.

The next available source of power is by electrical means. We already have accumulators for town work, and their use and radius of action are growing. Although up to the present the Edison accumulator is the only attempt to improve on Plante's original invention of the lead battery, it is practically certain that further developments of accumulators will take place in the near future, which will increase their usefulness and durability, and at the same time reduce the dead-weight carried. But there is another, and I think very hopeful, direction in which electrical power may be applied. The trolley system, so long used to take that power from wires at the roadside, is certain to be improved on; I am sanguine enough to believe that the unsightly and awkward trolley-pole may be entirely suppressed, and that Tesla's ideas of obtaining electrical power by induction from a charged wire at the roadside is capable of solution.

Finally, we come to the use of solid fuel. A few years ago there was a tendency during the rapid increase in the use of the petrol engine, due to its convenience, and to the cheapness of petrol, to think that our old friend steam—which was first on the road—was becoming a back number. I am glad to say that I see in the room the faces of several who thought with me that this would never be the case.

Owing to the perseverance of men like Foden, Clarkson and others, we luckily have on the road a great number of steam vehicles which are deservedly favourites, and I have quite recently seen the development of a Clarkson steam-driven three-ton lorry in its latest form. Of this development I, as an English engineer, feel very proud, and I am sure that the Coal Controller will feel with me how much we really owe to Mr. Clarkson for his inventive capacity and for his business-like foresight. His latest development is a marvel of simplicity and good engineering design. A three-ton steam-driven omnibus or van on this system can be driven and attended to by one man, just as easily as if it was petrol-driven. The fuel is coke, the radius of action is sufficient, and the working cost per mile for fuel is just one-third of that of petrol at its present price.

UNDEVELOPED RURAL DISTRICTS.

It is difficult to estimate the extraordinary economical advantages of a well-thought-out system of combined railway and road transport, for, on looking backwards, it is curious how we seemed to have missed the transport advantages that our great network of roads has given to us. Many English rural districts have remained entirely undeveloped. The value of farm and garden produce has been almost nil, and the value of the land correspondingly low. All this must be remedied by improved carriage facilities, so that land distant from town centres may become almost as valuable as accommodation land now is in the immediate vicinity of the town. The labour for road reconstruction will be available, and it is for engineers to see that it is rightly used.

ROAD RECONSTRUCTION.

Road reconstruction, I think, should take the form of re-surfacing our main roads in two half-widths, each of 10 ft., one half amply strong enough to carry 8-ton axle-loads driven at 6 miles an hour on steel tyres, or at 12 miles an hour on rubber tyres, the other half only being more lightly and cheaply surfaced to be able to carry axle-loads of 2 tons and under at higher speeds. By this method the cost of re-surfacing these roads can be greatly reduced. I estimate that the saving on this reconstruction of 50,000 miles of main and secondary roads would amount to 15 millions sterling—almost three days' cost of the war. This division of the road into two halves would entail traffic regulations to confine the "heavies" to using the strong half, but allowing the light traffic to spread itself and to use the stronger half wherever it is not occupied by heavies.

* Extract from presidential address to the Commercial Motor Users' Association.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is not Mr. F. M. Lupton, M.A., to be warmly congratulated on his excellent little pamphlet on "Wide Roads and their Influence on Housing"; for although it was written to call attention to the need of arterial and other roads in Leeds, does not the pamphlet cover a wider field and sum up the position in a very able and concise manner?

* * * *

Has not the development of the coal-gas-propelled motor been almost phenomenal when we find from the latest available returns that there are no fewer than 4,000 of such vehicles already running in the Metropolitan area, and that there are at least 15,000 in the United Kingdom? Was it not also rather surprising to see in a recent announcement that no less than 1,500,000 cub. ft. of gas is being supplied from the Manchester gasworks per week for traction purposes? Who would have thought when one first caught sight of the rather cumbrous-looking "gas bag" that it would have caught on with such rapidity?

* * * *

Is not the question of traffic congestion going to be one of the most serious problems of the future? Is there not already considerable congestion in some of our larger cities, not only of vehicular but also of pedestrian traffic? Are not our railway stations and our trains often overcrowded and congested; and are not our omnibuses, tramcars, tubes and underground railways so congested that it is often a fight for places and the "survival of the fittest"? How is all this to be avoided? Is it not evident that as our population increases and wages advance more and more people and commodities will require to be moved from place to place? How is this to be effected without some drastic changes in our present systems of transport?

* * * *

Is not the determination of the weight a road can carry one of the questions that is likely to arise with the development of motor transport? Is it not evident that where a first-class road could carry a certain weight on the axle, a side or secondary road would be quite incapable of doing so? Will it be necessary to bring up all our roads to the necessary strength, or will it be necessary to inaugurate a system of licensing for vehicles in certain areas, or restricting them to the use of certain roads only?

* * * *

Is there not in *Engineering News-Record* (New York) of May 16th an interesting account of a new design for houses for the working classes constructed throughout of concrete? As a feature of this construction is the adoption of an air space in the walls so as to ensure dryness and interior even temperature, may it not be suggested that the details of construction are well worthy of study by everyone interested in the housing problem?

* * * *

As afforestation is highly desirable at the present time owing to the large amount of tree-felling which is going on throughout the country, would it not be well for everyone interested in the subject to inquire further of Sir Arthur Fell, M.P., for particulars of the American machine which he stated in the House of Commons the other day is capable of planting 8,000 trees a day with the labour of only three men? How many trees could this number of men plant without the aid of this machine? On the other hand, what is its original cost and what are the expenses incurred in working it?

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The Official and the Housing, Town Planning, &c., Act, 1909.*

By J. W. COCKRILL, M.INST.C.E., Borough Surveyor, Great Yarmouth.

Even before the war commenced people existed who tried to describe the Act as a failure, because in the five years which had elapsed since it became law a large number of local authorities had not rushed to adopt the clauses comprised in Part II. with which the members of this institution are chiefly concerned. Unfortunately, while the clauses in Part II. may be adopted or not, at the option of the local authority, Part I. was compulsory. The author of this paper believes that every clause in this part of the Act is useful and necessary, and is requisite as preparation for town planning. He has seen that their working has made the name unpopular, and as there is a great deal in a name when the object it stands for is likely to touch the landlord's pocket, or to affect the security of the mortgagee, it has blocked the way to more than one scheme, and has cut the ground from under the feet of officials who have realised the importance of town planning. The only way to retrieve the lost ground is to make Clause 2 compulsory.

There is every reason to fear that some of the officials who would have had the work of preparing schemes, while being fully alive to the benefits conferred by the Act, have also felt keenly the delay caused by the conditions previously set out. They, with an insufficient staff, considered the work required by the first set of Procedure Regulations too much for them to undertake, in referencing and serving notices on owner and occupier and preparing the plans required. By the second set of regulations issued in 1914 this work was considerably reduced, so much so that, as an example of how expeditiously the work can be carried out, an authority gave instructions to proceed with the steps necessary for the adoption of Part II. to an area of 1,660 acres, with seventy owners or persons interested to be served with notices—the number of persons interested under the first set of Procedure Regulations would have been 250. Within seven months the plans were prepared, notices served, owners interviewed, a public meeting held, the land bound by the notice to the Local Government Board, the enquiry held and assent received, with no additional staff provided in any of the offices carrying out the work.

THE DIFFICULT TIMES.

The war has had a most disastrous effect on the preparation of schemes. Consider the work thrown on town clerks and clerks to the local authorities. The duties imposed by Acts of Parliament, Orders in Council, Defence of the Realm Act and the Orders attached and following it, and the organisation of all sorts of charitable objects added to the ordinary work, and all this with reductions in staff withdrawing youth and energy for military purposes at the time when it was most needed. Although so many items of the class named above have not been placed on the surveyors' and engineers' departments, members present will know how difficult the time has been. To a heavier degree they have suffered by the withdrawal of staffs both in and out of the office of men of military age. Work has had to be done by those entirely unaccustomed to it, and the difficulties which have followed in administration have increased. Piled on which there has been added trouble in obtaining priority certificates, consents to carry out work and delivery of materials. Also shortage of horses and all classes of haulage, and increases in prices has rendered estimating an almost impossible task; in addition, many of us have had something to do for "The Forces." That is a picture of the daily life during the last three years of a large number of the members present, and it has left no time to spare for town-planning schemes. This state of affairs in the two departments which would have had the conduct of affairs fully accounts for the inactivity of the local authorities during the past four years.

IMPORTANCE OF CAREFUL STUDY.

It is to be hoped that this institution, which has proved itself in the past keenly alive on all the subjects of use and interest to its members, will fully realise the importance to them of a careful study of the many complicated questions arising in the preparation of a scheme for which the engineering official of the local authority is undoubtedly the best man to deal, and there are some points on which he is the only one who can adequately perform the task. The duty of this institute is therefore to see that its younger members at least shall be fully qualified.

That there is real importance in the foregoing is proved by a return for which information was collected in January, 1916. There were then in England and Wales 145 schemes in course of development covering more than 250,000 acres for 92 local authorities whose own officials were carrying out the work; 76 of them were members of this institution. In Scotland, with 17 schemes covering 27,115 acres for 12 local authorities, the officials of 10 of these were preparing the schemes. Progress was stopped in about half the cases in consequence of war conditions. May we not anticipate that on the declaration of peace the reconstruction of which so much has been heard, and in which all the institute's members expect to take a share, will demand the bringing forward of these schemes which will no doubt have benefited by knowledge and experience added during the enforced hibernating period. At any rate, the author knows of one that has so benefited.

Who so capable as the official in daily touch with the technical work of his district to inaugurate and prepare a scheme on the most useful lines if he takes the interest in his work, usual to members of this institution, and has the desire to forward any matter for the good and comfort of his town and its proper planning for the present and future? The maps which show its historical development will be continually before him, including the Ordnance Survey in its various editions; unfortunately in many cases the last survey is twenty years old, and requires a considerable quantity of making up. If in making them up the buildings of the census periods are marked in distinguishing colours it will be a great help in showing the area most likely to be of use if town planned. As the extensions of a town have been going on more or less preparation has been made for the problems of sewage, water supply, lighting and traffic. The official knows how far he may depend upon getting the help of his authority in providing the necessary funds, and is able to judge the amount of support or opposition to be expected from the general public. This does not mean that the occasion is not likely to arise when it will be very desirable to call in an expert on some æsthetic or technical subject in which there may be amenities to be preserved or some traffic problem where such outside help and evidence may be necessary.

THE ACT JUSTIFIED.

If nothing else had been achieved beyond the Ruislip-Northwood and the Birmingham schemes the Act has thoroughly justified itself. Their clauses cover so much ground and show such infinite care and painstaking plodding that the five years or thereabouts spent upon the work gives local authorities and their officials entirely new ideas for controlling and regulating building operations, not by hard-and-fast by-laws, but by agreement and consideration on fixed lines by which both sides were expected to give something. In the result the owner cannot escape the liability of providing in the lay-out of an estate for the amenities and conveniences of the district and the strict regulation of the number of buildings on an acre of land, such limitation and regulation not rendering the local authority liable to pay compensation; and, on the other hand, there is power to grant reduction within fixed limits of road making standards which compensates for all that the owners were asked to give. We all believe Mr. Raymond Unwin's maxim, that "There is no profit in overcrowding," and consequently that the restriction of the number of buildings to the acre is no loss to the landowner.

The educative effect of the work of these two towns has been immense, and it is hoped that the author of the Act, as well as those having any part in the schemes named, knows how far this effect has reached and that all are satisfied with the result of their labours. To study the finished schemes beside the drafts as first published will show the trouble taken by the Local Government Board and their officials to provide even-handed justice and to make the schemes workable.

PREPARATION OF SCHEMES.

And then the words "town plan" and what they convey to the administrators of a town where business prosperity has demanded developments and to councils and officials who have seen the fearful waste of public money in the old haphazard system. They have seen that this has to be made good at an appalling cost, burdening the towns with debts which could have been saved if the advantages that will result from the possibilities now presented had been realised half a century before. For the first time an Act of Parliament gives the local authorities the right to prepare a town plan and to lay down thereon the lines on which the future development of the town or district shall take place; to set out the principal arteries of traffic; to allocate areas of land for all the purposes of the city's life—the factory and manufacturing area, the residential area—and thereon to fix the number of houses to be built on each acre of land and to set aside spaces for recreation purposes and lungs around

* Paper presented at the annual meeting of the Institution of Municipal and County Engineers.

a city. Beyond these objects the authorities have power to acquire and retain land by easier processes than has been done before, and, what is equally important, to retain such surplus as there may be instead of as in the old wasteful way compelling the authority to dispose of it, thus losing opportunities which Prof. Geddes speaks of as "Making the field gain on the street and not merely the street gain on the field," and "Towns must cease to grow like expanding inkstains and grease-spots. Once in true development, they will repeat the star-like opening of the flower, with green leaves set in alternation with its golden rays."

Now these powers are given, and no limit is placed upon the time in which the work need be carried out as would be done where an authority obtained an Act of Parliament. The improvements need only to go on as and be carried out when there is the demand for development, but as the allocation of the land is secured to a particular purpose this development must take place only on the lines laid down in the town plan.

In addition the power is given to set out wide streets and to allocate the spaces in such widths to carriageways, grass margins, footways, and tree planting, to make of these roads what Mr. J. A. Brodie calls "elongated parks," and then with the restricted number of houses to the acre there is no need for the owner of the land to be stingy in the forecourt allowed. Assume that you get a road 120 ft. wide, with 40-ft. forecourts, making 200 ft. between the house fronts, three-fourths of which would be vegetation, giving a green belt out into the country where, by judicious planning, it would intersect a series of other similar roads forming ring-roads round a town or belts of vegetation in recreation grounds, gardens and open spaces.

Such a picture may be considered idealistic and rather far-fetched, but if only the officials and the members of this institution will take up the work in their districts on these lines, and put the thoughts so crudely expressed into practice, they will have no difficulty of improving upon them.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

Water Supply.—"Domestic" writes: An urban district council supply water in their district. Is the occupier of an inn entitled to a supply at the domestic rate, or can the council make an extra charge for water used in the business?

In my opinion, if the use of the water is in its nature domestic, the innkeeper is entitled to a supply at the domestic rate, notwithstanding the fact that some of the water may be used for the purposes of the business; and I do not think the council can make an extra charge. See *Metropolitan Water Board* v. *Avery* (29 T.L.R., 513).

Repair of Footbridges.—"W. H. F." writes: Will you kindly inform me who is responsible for the repairs to footbridges in connection with public footpaths across private property? I have in mind a certain footbridge which crosses a ditch dividing two farms. Is the owner to whom the ditch belongs or parish council responsible?

Assuming that the bridge forms part of the footpath, it is, in my opinion, reparable by the rural district council, as highway authority, unless it can be shown that the owner is liable to repair it *ratione tenuræ*. The parish council have power to undertake its repair, under sec. 13 (2) of the Local Government Act, 1894; but they are not bound to do so.

Temporary Buildings.—"J. H. H." writes: I shall be obliged if you will give me your opinion on the term "temporary building," Sec. 27, Public Health Acts Amendment Act, 1907. Several plans have been submitted to the corporation for buildings of the bungalow type with wood walls, which of course do not comply with the building by-laws of this district. Can such, as domestic buildings, be brought under this section and approved, subject to removal on six months' notice?

In my opinion a local authority have power under this section to approve a temporary building of the bungalow type, subject to a condition that it shall be removed on six months' notice.

Laying out a New Street. "Practical" writes: The owner of a field adjoining an old road in this district has submitted plans of a row of cottages which he proposes to erect about 200 ft. from the road, with an approach consisting of a footpath 6 ft. wide. The council have refused to approve the plans unless he constructs the approach as a carriage road 36 ft. wide, and I shall be much obliged if you will state whether in your opinion he can be compelled to do so. The Model By-laws are in force in the district.

Yes; in my opinion he can. The approach is a "new street" within the meaning of the by-laws, and, being over 100 ft. in length, it must be constructed for use as a carriage road, 36 ft. wide, in order to comply with the requirements of the by-laws. See *Attorney-General* v. *Gibb* (1909; 2 Ch., 265).

MUNICIPAL AND COUNTY ENGINEERS MEETINGS.

STRETFORD PROGRAMME.

The programme of the two-days' institution meeting at Stretford on July 19th and 20th is as under:—

Friday, July 19th.

Meet in the Seymour Park schools, Old Trafford.

2. 0 p.m.—Business meeting of the institution.

2.15 p.m.—Welcome by the chairman (Mr. T. B. Finney, J.P.) and members of the Stretford Urban District Council.

Discussion on the following paper, which will be taken as read:—"Public Works in Stretford," by Ernest Worrall, F.S.I., engineer and surveyor, Stretford.

Afternoon tea with Mrs. Finney at the close of the meeting.

4.15 p.m.—Visits by char-à-banc to works mentioned in the paper. Mr. Platt (Rochdale) will show a new steam vacuum gully emptier.

6.30 p.m.—Reception at Grand Hotel by Mr. T. B. Finney, chairman of council.

6.45 p.m.—Dinner at the Grand Hotel. Morning dress. Mr. Finney extends a cordial welcome as his guests to all members of the institution.

Saturday, July 20th.

9. 0 a.m.—Special tramcars will leave Portland-street for Trafford Park, Stretford, and will call at the Technical Institute, Stretford-road, Old Trafford, at 9.15.

9.30 a.m.—Visit to the Ford motor works, Trafford Park.

10.30 a.m.—Visit to the British Westinghouse Company's works, Trafford Park.

12. 0.—Light refreshment kindly provided by the British Westinghouse Electric and Manufacturing Company, Limited.

MAIDSTONE PROGRAMME.

The following are the arrangements for the institution meeting to be held at Maidstone on Saturday, July 27th:—

12 noon.—Meet at town hall. Reception by the mayor. Discussion on the following papers to be taken as read:

"Municipal Works in Maidstone during Past Twenty-five Years. By Mr. T. F. Bunting, borough engineer and surveyor.

"Kent Roads Before, During and After the War." By Mr. H. T. Chapman, county surveyor.

"Some Notes on the Maidstone Borough Electricity Works." By Mr. E. E. Hoadley, borough electrical engineer.

1. 0 p.m.—Lunch.

2. 0 p.m.—Visit electricity generating station and public baths.

2.45 p.m.—Proceed by river to visit Messrs. Tilling Stevens, Limited, petrol electric motor works, inspect works, vehicles and extension of factory buildings in reinforced concrete.

4. 0 p.m.—Proceed by river to Maidstone electric sewage pumping station. Tea provided by kind invitation of Messrs. Bunting and Chapman.

6. 0 p.m. (about).—Arrive back at Maidstone.

MOTORS AND MUNICIPAL WORK.

Cupar Town Council have decided to purchase a motor road tractor to haul their fire engine.

Colwyn Bay Urban District Council have appointed a committee to consider the purchase of a motor vehicle for haulage purposes.

Uxbridge Urban District Council have accepted the tender of Messrs. Dennis Bros., Limited, Guildford, for a turbine motor fire engine with suction adapter, telescopic ladder and hose complete.

The surveyor to the Coulsdon and Purley Urban District Council, Mr. R. Chart, reported that he has now got a priority certificate for a new steam van, and that Messrs. Foden's, Limited, could supply one in ten weeks. Price with steel tyres, £914; rubber tyres, £1,014. Mr. E. J. Saunders said the Machinery Committee asked for the rubber tyres, because without them it was impossible to get vans up the hills. He also pointed out the great importance of these vans, as horses being unobtainable without these the work of the council would have been at a standstill.

Electric Power Supply Committee's Report.—Asked what action he proposed to take on the report of the Committee on Electric Power Supply, the President of the Board of Trade stated in the House of Commons that it was receiving careful consideration. The report raised issues of great importance, and no time would be lost in dealing with the matter.

CONCRETE HIGHWAY BRIDGE DESIGN.

ONTARIO HIGHWAY DEPARTMENT'S SPECIFICATIONS.

Owing to the non-uniformity of bridge designs and the unwarranted number of failures, an amendment to the Ontario Municipal Act was passed in 1916 making it compulsory to submit plans of any bridge exceeding 20 ft. in length to the Department of Highways for the approval of their engineers.

The intention of the legislation is primarily to standardise the strength of the structures—but not particularly the design—since any method, such as beam, truss, arch or suspension, may be employed so long as the stress can be statistically figured. Prior to the passage of the amendment many municipalities would call for competitive designs, along with prices for material from the various steel companies and from concerns interested in the sale of some particular steel bar for reinforcing. These designs were, in isolated cases, the work of some inexperienced and incapable draughtsman, and occasionally companies who were commercialising the profession were prone to "skimp" the work in order to secure the sale of their material. The members of a municipal council, not being engineers, could hardly be expected to check the figures, and generally made the mistake of accepting the lowest tender, without any regard to the strength of the structure. It was supposed that the plans were prepared by competent engineers who knew their business and who were compelled to abide by certain regulations governing the design. The investigation of the department brought out many incidents, such as the failure to place lateral braces on the trusses of a steel bridge to provide for any side shear, and the using of too light a section to take care of the load. Other failures were traced directly to the lack of proper supervision. In order to facilitate the operation of the act the department designed typical plans and specifications along approved lines. These plans and specifications are for the guidance of engineers in bridge design, and typify the character of design approved of by the department of highways.

Several tables and interesting sections from the general specifications of concrete highway bridges follow:—

The general type of concrete bridge shall preferably be as follows, but it is understood that the limiting lengths are not absolute, and may be varied as occasion permits:—

(1) A concrete arch, or concrete abutments with slab covering for spans up to 18 ft.

(2) A concrete arch, or concrete beam bridge for spans from 18 ft. to 40 ft.

(3) A concrete arch for spans exceeding 40 ft. in length.

(4) All parts of the concrete structure shall be proportioned so as not to exceed the following unit stresses in pounds per square inch for stone or gravel concrete:—

Extreme fibres of beams and slabs for bending...	650
Columns whose length does not exceed 15 times the least width	500
Hooped columns, whose length does not exceed 15 times the least width	650
Shearing stress in concrete	60
Bond between plain steel and concrete...	60
Bond between deformed steel and concrete	100
Tension in structural steel	16,000
Hard steel, tension	20,000

Reinforced concrete beams and slabs will be designed on the assumption that compressive stresses vary directly as the distance from the neutral axis. No allowance will be made for concrete in tension. The ratio of moduli of elasticity for steel and concrete will be assumed as 15. All calculations will be based on concrete having a crushing strength of 2,000 lb. per square inch in twenty-eight days.

CLASSIFICATION.

Bridges will be classified according to loading as follows:—

Class A—Bridges suitable for main country roads.
Class B—Bridges suitable for light country traffic.
Class C—Bridges suitable for heavy and concentrated traffic.

	Uniform live load. Lb. per sq. ft.	Concentrated live load.	Floor load. Pounds.
Class A ...	... 100	15 tons	3,000
Class B ...	... 100	10 ,,	3,000
Class C ...	... 135	20 ,,	4,000

PROPORTIONS OF GRAVEL, SAND AND CEMENT.

The proportions of materials to be used in mixing "fine" concrete shall be by measure, loose, and, unless otherwise directed by the engineer, shall be as follows:—

GRAVEL CONCRETE.

(*a*) Abutments, piers, and wing walls: One part of cement to six parts of gravel.

(*b*) Arches from the springing line, floor slabs, beams, and columns: One part cement to five parts gravel.

(*c*) Floor slabs used as pavements, parapet walls and handrails: One part cement to four parts gravel.

BROKEN STONE CONCRETE.

(*d*) Abutments, piers and wing walls: One part cement, two parts sand and five parts broken stone.

(*e*) Arches from the springing line, floor slabs, beams and columns: One part cement, two parts sand and four parts broken stone.

(*f*) Floor slabs used as pavements, parapet walls and handrails: One part cement, and one-half parts sand and three parts broken stone.

The proportioning of materials may be varied by the engineer from the foregoing, on the basis of voids in the aggregates, to secure a compact mixture, but the amount of cement is also to be determined by the strength of mortar required. In no case is less cement to be used than is needed to fill the voids in the sand or fine aggregates when dry; but the interstices of the coarse aggregates should be measured and at least sufficient mortar used to fill the voids and give a 10 per cent surplus.

BONDING CONCRETE.

Where mass concrete work is interrupted before its completion or at the close of the day, a sufficient number of well-wetted one-man stone shall be placed so as to project above the concrete surface to ensure bond with succeeding concrete work. Before the work of depositing concrete is resumed this surface shall be thoroughly wetted and cleansed of foreign material and laitance. A mortar consisting of one part cement and two parts sand shall be then deposited on the wetted surface to a depth of about ½ in. when the work of placing concrete shall be resumed. Where thin sections of concrete work are interrupted, or at the close of the day, no concrete shall again be deposited until the surface has been roughened, thoroughly wetted and cleansed of foreign material, and a mortar of one part cement to two parts of sand spread over the wetted surface to a depth of about ½ in.

Women Labourers engaged in Tar-Spraying at Westminster.

WOMEN TAR-SPRAYERS.

SATISFACTORY RESULTS AT WESTMINSTER.

Women have for some time past been employed on tar-spraying at Westminster, and Mr. J. W. Dugdale-Bradley, the city engineer, reports that, generally speaking, their work has been quite satisfactory. Hours, wages, &c., are as follow:—

Hours.—Fifty per week.

Wages.—1s. 0¾d. per hour, rising to 1s. 2¼d. per hour on satisfactory service. The women who manipulate the brushes for spraying the tar receive an additional 2d. per hour.

Uniform.—Overalls, clogs, caps and gloves are supplied.

Portable mess rooms and lavatories are provided.

The Editor will be glad to receive copies of annual and other reports dealing with matters of interest to "Surveyor" readers.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week. Other reports will be found on our "Local Government Board Inquiries" page.

BUILDINGS.

Blackpool T.C.—A proposal is being considered for the construction of an open-air swimming bath near Uncle Tom's Cabin, at an estimated cost of £16,000.

Dudley T.C.—An intimation has been received that the Local Government Board cannot sanction the borrowing of a loan for the purpose of the proposed new public baths.

Glasgow T.C.—An intimation has been received that the Treasury are prepared conditionally to sanction the raising of a loan of £125,000 for an extension of Knightswood Hospital.

Merthyr T.C.—Sanction has been received to schemes for a central public library on the St. David's School site, and also for additional accommodation for the stipendiary magistrate, county justices, and clerks, the work to be carried out after the war.

Ripon T.C.—The city council have resolved to proceed with a scheme proposed by the borough surveyor, Mr. A. Barlow, for building a public mortuary at the highways depot, Skellbank, at an estimated cost of £100, instead of at Hall Yard, as previously suggested.

St. Ives (Hunts) T.C.—A scheme has been approved for the provision of a public slaughter-house.

Torquay T.C.—It was stated that the revenue account of the new public baths (swimming and medical) for the past two years showed a deficit of £2,191, £1,000 of which had been provided for in the general district rate for the current half-year.

REFUSE COLLECTION AND DISPOSAL.

Ealing T.C.—It was reported that a total of £1,152 had been received for the collection and disposal of waste material during last year.

Swindon T.C.—The town council have arranged for a weekly collection of waste paper by the house scavengers.

ROADS AND MATERIALS.

Benfieldside U.D.C.—The surveyor, Mr. T. Knox, reported that during one week, between 6.30 a.m. and 6.30 p.m., no fewer than 1,018 vehicles of various descriptions passed over the road between Shotley Bridge and Shotley Bridge Station, many of them of a very heavy kind. An inspector of the Road Board had visited the road, and stated that it was in good order. The cost of maintaining this road was 130 per cent more than the average of any previous year. The chairman said it was not much encouragement to the council to keep up their roads when they were told that there would be no grant, and the surveyor was instructed to forward to the county surveyor a statement of the additional cost of upkeep.

Brixworth R.D.C.—The surveyor, Mr. C. Churchill, reported that an engineer from the Road Board had inspected the Foxhall road to view the damage caused by timber traffic, respecting which the council are making a claim. The engineer had come to the conclusion that the council were entitled to £300, and had explained that in cases where the Government were directly responsible for the damage claims were paid immediately, and the Road Board were pressing the War Office to settle third party claims of this description.

Cheltenham T.C.—Owing to the difficulty of procuring tarred stone, the borough surveyor, Mr. J. S. Pickering, has received instructions to report on the cost of a mixing plant at the destructor works.

South Stoneham R.D.C.—It was reported that the military authorities had authorised the council to carry out road works estimated to cost £685.

Stafford R.D.C.—Subject to the adjoining owners giving the necessary land, it has been agreed to proceed with the improvement of the Walton and Brocton road.

Stockbridge R.D.C.—The surveyor, Mr. W. J. Ayles, submitted a report upon the district roads from the military authorities, setting out what they considered was necessary to repair the damage caused by their traffic. He calculated it would take rather more than 2,000 tons of stone to do the repairs they sanctioned. At present he was stopping some of the worst potholes with coarse gravel from Longstock.

Taunton T.C.—A scheme has been approved for taking the necessary steps to close and divert Mount-lane, and also to construct a new pathway, the work to be carried out to the satisfaction of the town council.

SEWERAGE AND SEWAGE DISPOSAL.

Bishop's Stortford U.D.C.—Included in the works which the council have decided to carry out after the war are the Hockerill drainage scheme and the provision of sewage-pumping machinery and extension of the engine-room.

Cambridge T.C.—The town council agreed to increase the war bonus of Mr. Smith, sewage farm manager, to £55 a year. Mr. Smith's present salary is £165, with house and firing.

Leicester T.C.—Councillor Sherriff, in moving the adoption of the report of the Sewage Works and Farms Committee, stated that the policy of the committee was gradually changing. It used to be concerned chiefly with sewage and bullocks, but the farm was becoming more and more a food-producing concern with great potentialities. Last year they tried the experiment of growing potatoes, 8 acres being planted, producing 9½ tons per acre. This success justified them in developing the experiment, and this year they had planted 39 acres of the farm with potatoes.

WATER, GAS, AND ELECTRICITY.

Coventry T.C.—It was pointed out, with respect to the success of the electricity undertaking, that the total increase in price to power users over pre-war rates was only 15·3 per cent, compared with from 30 to 60 per cent in other parts of the country. No increase had been imposed to the ordinary consumer for lighting or domestic purposes. The Coventry electricity undertaking ranked seventh largest in regard to output, and obtained the lowest average revenue per unit sold. The low charges had proved to be the success of the undertaking, and had only been made possible by the very low cost of generation.

Haverfordwest T.C.—The town council, in committee, are considering the steps to be taken consequent upon the refusal of the Local Government Board to sanction a loan of £4,000 in connection with the gas undertaking.

Lincoln T.C.—The city council on Tuesday resolved to carry into effect a scheme for the purchase and extension of Messrs. Clayton & Shuttleworth's power station, at an estimated cost of £240,000.

Merthyr Tydvil T.C.—Through a leakage in the embankment of Dolygaer reservoir, which supplies Merthyr Tydvil, 1,000,000 gallons of water are daily running to waste. The present supply is sufficient for only a fortnight or three weeks.

Mountain Ash U.D.C.—A committee, with the surveyor, Mr. W. G. Thomas, has been appointed, with power to act, in the matter of the extension of the water supply.

Poplar B.C.—The Electricity Committee propose to fit one of the boilers at the electricity works with a new type of chain-grate capable of burning breeze, coke, or anthracite coal, at an estimated cost of £3,000.

Prestatyn U.D.C.—In view of the shortage of coal, the surveyor, Mr. F. Wilkinson, has been authorised to construct a small water-gas plant, principally with materials now lying at the works. This, he stated, should add considerably to the make of gas per ton and at the same time utilise to advantage coke which he expected would accumulate during the next few months.

Swansea T.C.—The Electricity Committee have decided to purchase two 650-k.v.a. transformers in connection with the scheme for the supply of electric power to the Harbour Trust.

MISCELLANEOUS.

Lewisham B.C.—On the recommendation of the General Purposes Committee it has been resolved to establish a piggery on a small scale as an experiment. It is proposed to purchase half a dozen young pigs, and to fatten them at the council's depot at Woodstock-road, Lee.

Ripon T.C.—The borough surveyor, Mr. A. Barlow, submitted a scheme for making jam at the Stallhouse, in Blossomgate, to make use of the spare fruit in the city, and the General Purposes Committee were authorised to go on with the matter.

Swindon T.C.—The town council have purchased thirty-six pigs for breeding purposes and for sale to the ratepayers.

Wolstanton U.D.C.—The surveyor, Mr. W. F. Slater, having transferred his office to Moreton House, furnished it, and provided a clock, the council have granted him £100 per annum towards the extra cost incurred by him.

Royal Sanitary Institute.—At a meeting of this body to be held at the town hall, Swindon, on Saturday, the 13th inst., at 11 a.m., a discussion on "Camp Drainage, &c.," will be opened by Mr. W. H. Beswick, military engineer, Larkhill Camp.

PERSONAL.

Mr. J. E. W. Birch, borough engineer of East Ham, has had his salary increased by £50 a year.

Mr. H. L. Taylor, surveyor to the Glemsford Urban District Council, has been voted a war bonus of £20.

Mr. E. Phillips, temporary surveyor to the Launceston Rural District Council, has received an increase of salary.

Mr. H. J. Hamp, borough surveyor of Swindon, has had his salary increased by £50 per annum, and Mr. W. Greenwood, assistant borough surveyor, by £15.

Mr. J. Neave, assistant surveyor to the Walthamstow Urban District Council, has been appointed surveyor to the Aldershot Urban District Council in succession to Mr. F. C. Uren.

Captain J. S. Smith, of the 137th A.T. Company, R.E., British Salonica Force, has been awarded the Military Cross. In civil life Captain Smith is county road surveyor of the Kintyre District of Argyllshire.

Mr. G. E. Mitchell, divisional surveyor for the northern division of West Suffolk, has had his salary increased by the Highways and Bridges Committee of the county council from £165 to £200, and Mr. H. H. Pettitt, divisional surveyor for the southern division, from £196 to £220.

Mr. T. Gregory, surveyor to the Newburn Urban District Council, who accepted a commission as a technical officer in the Labour Corps, has been obliged to relinquish his commission owing to a broken ankle sustained whilst on active service in France. Mr. Gregory volunteered for this work when in his forty-fifth year, and after eight months' continuous service at the Front, retires with honorary rank of Second Lieutenant. Most of this time he spent on road work.

PRESENTATION TO MR. C. H. COOPER.

LOWER THAMES VALLEY SURVEYORS' TRIBUTE.

On Saturday evening last the engineers and surveyors of the Lower Thames Valley and the surrounding districts met at Wimbledon with the object of commemorating the retirement of Mr. C. H. Cooper from the position of borough engineer and surveyor. Mr. A. Dryland, county engineer and surveyor, Surrey, presided, and there were present the Mayor of Wimbledon (Alderman Simpson), Alderman T. R. Porter, Councillor J. A. Duff, Messrs. T. W. A. Hayward, president of the Institution of Municipal and County Engineers, H. T. Wakelam, county engineer and surveyor (Middlesex), J. H. Brierley (Richmond), S. W. Barnes (Hanwell), S. H. Chambers (Hampton), G. F. Carter (Croydon), E. R. Capon (Epsom), H. F. Coales (Sunbury), J. S. Crawshaw (Weybridge), H. C. Fread (Thames Ditton), W. H. Grieves (Sutton), Willis Gale (Carshalton), R. W. Hindhaugh (Ham), M. Hainsworth (Teddington), R. H. Jeffes (New Malden), F. W. Pearce (Twickenham), G. Stevens (Feltham), H. H. Skipper (London), J. Stevenson (East Molesey), T. E. Ware (Epsom Rural), R. Wilds (Walton), E. Willis (Chiswick), F. Wilkinson (Deptford), W. M. Shepherd (Wimbledon), H. Tomlinson Lee (Wimbledon), G. J. S. Booth (Wimbledon), and W. H. Webb (Wimbledon).

Letters and telegrams containing many expressions of appreciation of the municipal and professional work of Mr. Cooper were read from Messrs. O. Claude Robson (Willesden), R. M. Chart (Mitcham), H. Stowell (Manchester), P. Dodd (Wandsworth), E. Van Putten (Lewisham), H. P. Boulnois (Westminster), E. J. Elford (Cardiff), E. J. Lovegrove (Hornsey), W. R. Hicks (Ealing), R. H. Clucas (Kingston), S. F. R. Carter (Wallington), J. W. Croxford (Brentford), J. A. Webb (Hendon), and P. J. Parkman (Leicester).

Mr. Hayward said that he felt it a privilege and an honour to be present, and he congratulated Mr. Cooper upon the completion of a long period of years spent in municipal activities. He looked back on his younger days when first he met Mr. Cooper, since when, having come to know him more intimately, his appreciation of Mr. Cooper's character and ability had grown correspondingly, and he found that his influence for the good of the profession was constantly at work in an unobtrusive way. He was thankful for the friendship he had established with their guest, and he sincerely wished him health and happiness in his retirement. Mr. Pearce, who followed, remarked that the keynote of Mr. Cooper's popularity was the constant desire to be helpful to others. This trait in Mr. Cooper's character was emphasised in succeeding speeches by Mr. Wilkinson—his former deputy—and by Mr. Willis, the latter observing that he was sure there was a host of men who were indebted to him.

In asking his acceptance of an inscribed silver cigar-box, the chairman said he thought that very few could have had greater opportunities of judging of Mr. Cooper's personal and professional character than he had. He had his sincere congratulations upon the completion of his forty years' service under one authority, a circumstance he thought must form at any rate a unique record, and, what was even more to the purpose, he had retained the esteem and regard of his corporation right through to the day of his retirement. Their gift was intended to mark the esteem and regard which they had for him, and they hoped that it would serve to remind him of his old colleagues and of all the happy events that had clustered around a long and active municipal life.

In a feeling reply Mr. Cooper said their gift was more than gratifying to him. He would never forget their kindness to him, and he thanked them from the bottom of his heart for this evidence of their goodwill.

The singing of "Auld Lang Syne" and the National Anthem shortly afterwards brought the proceedings to a close.

Lord Mayor as Scavenger.—The strike of municipal employees in Cardiff had an unusual sequel on Tuesday night, when the Lord Mayor, aldermen, and city councillors and their friends turned out to clean the two principal thoroughfares, St. Mary-street and Queen-street, in which had accumulated the dust and filth of a fortnight.

FOR OTHER ADVERTISEMENTS
See End of Paper.

CITY OF OXFORD.
Wanted immediately, for the Sewage Pumping Station at Littlemore, 3 miles from Oxford, a Second Engineman to work under the Resident Engineer.
Wages, £2 2s., and a War Bonus of 5s. per week.
A house on the site is provided rent free, with coal, light, &c.
Sealed applications, endorsed "Pumping Station," stating age and previous experience, must reach the City Engineer, Town Hall, Oxford, on or before Thursday, the 18th July instant.
Candidates must be ineligible for Military Service.
Dated 3rd July, 1918. (3,818)

COUNTY BOROUGH OF ROTHERHAM.
ENGINEERING ASSISTANT.
The Corporation invite applications for the appointment in the Borough Engineer's Department of an Engineering Assistant (temporary), at a salary of £150 per annum, including war bonus.
Applicants must have had experience in surveying and levelling, inspection of building and drainage works, and a knowledge of building construction.
Applications, in candidates' own handwriting, giving full particulars of experience, age, present and previous appointments, and accompanied by three recent testimonials, to be delivered to Mr. Chas. L. Des Forges, Town Clerk, Town Hall, Rotherham, by 10 a.m. on July 15th.
Canvassing will disqualify.

URBAN DISTRICT COUNCIL OF WOODBRIDGE.
The above Council invites TENDERS for the supply of 282 tons of Broken Granite, 1¾-in. gauge, to be delivered carriage paid to Woodbridge G.E.R. Station.
Tenders and Samples to be delivered to Mr. Walter Brooke, Council Offices, Woodbridge, endorsed "Tenders for Granite," on or before the 23rd July, 1918.
W. G. WHISSTOCK,
Surveyor.
Woodbridge.
July 3, 1819. (3,819)

METROPOLITAN BOROUGH OF WANDSWORTH.
The Wandsworth Borough Council is prepared to receive Tenders for the Construction of Surface Water Drain at Wandsworth Cemetery, Magdalen-road, Wandsworth.
The Specification and Drawings may be seen, and Forms of Tender and Contract obtained at the office of the Borough Engineer, M. P. Dodd, M.INST.C.E., 215 Balham High-road, S.W.
No Tender will be entertained unless it is made upon one of the Forms issued for the purpose, and delivered at the Council House, East Hill, Wandsworth, S.W., not later than 12 o'clock noon on Monday, the 22nd July.
D. A. NICHOLL,
Town Clerk.
Council House, Wandsworth, S.W.
July 2, 1918. (3,817)

TAR MACADAM AND SCREENING PLANT WANTED.
The Corporation of Cheltenham invite Tenders for Plant (new or second-hand) for screening and tarring not less than 50 tons of clinker and stone per day. The lowest of any Tender will not necessarily be accepted.—Further particulars from J. S. Pickering, Borough Municipal Offices, Cheltenham.
(3,816)

HOUSING NOW AND AFTER THE WAR.

ADVISORY PANEL'S SCHEME.

There was issued on Tuesday the memorandum of the Advisory Housing Panel of the Ministry of Reconstruction—six members of the Reconstruction Committee who were invited by the Minister to complete a review of the housing question as it is likely to present itself at the close of the war. The panel was composed of the Marquis of Salisbury (chairman), Major John W. Hills, M.P., Mr. Thomas Jones, Mr. B. S. Rowntree, Mr. Leslie Scott, M.P., and Mrs. Sidney Webb.

The memorandum was signed in October, 1917, and the lowest limit of the number of houses which should be built in 1918 is given as 300,000 if the war had ended in 1917, the remaining conditions to be satisfied being: (1) That building be begun without delay after the conclusion of peace in order that the labour made available by demobilisation may be absorbed and unemployment prevented; (2) That the opportunity be taken for ensuring a good standard of design and lay-out; (3) That the houses are built in the localities where they are most needed.

Owing to the high cost of materials it was clear to the panel that no considerable number of houses would be built in the year after the war unless financial aid was coming from public funds, and they propose the following scheme:—

(*a*) That the State should provide the whole cost of the building, and should own the houses for a period to be fixed—say five years—at the end of which prices may be expected to have attained a normal level. This period is referred to as the transitional period.

(*b*) During this period the local authority will act as agents of the State, and will be responsible, subject to the approval of the district commissioner hereafter described, for building and managing the houses and collecting the rents.

(*c*) At the end of the transitional period the ownership of the houses will be transferred to the local authorities at a figure to be arrived at by deducting from the original cost such percentage as represents the fall in price of materials and labour, together with the fair allowance for depreciation.

(*d*) During the transitional period the rents, collected by the local authorities as agents, will be paid over to the State. In urban districts the aim should be to fix rents at a figure likely to provide a fair interest, sinking fund, &c., when normal conditions are restored and the abnormal cost has been written off. In rural districts the rents should be fixed in consultation with the Agricultural Wages Board, and in co-operation with that body raised by stages to a similar figure, which should be reached by the end of the transitional period.

(*e*) Upon the transfer at the end of the transitional period it should be incumbent upon the local authorities to secure, as far as may be practicable, rents sufficient to cover the annual charges.

(*f*) It will be clearly impossible to forecast accurately the date when, conditions having become normal, the transitional period may be equitably considered to be concluded. It may be desirable, therefore, to give power to the Government of the day to postpone by order the date of the transfer of ownership in any district where circumstances might require it.

IMPROVED STANDARD OF BUILDING.

This scheme, it is pointed out, provides an opportunity of securing permanently a greatly improved standard of building. "The Government should therefore insist on a high standard of design and lay-out, and, save in exceptional circumstances, on a restriction of the number of houses built to the acre to, say, twelve in the towns and to eight in the country." The responsibility for administering the financial aid and the duty of securing promptly an adequate supply of houses would be placed on the Local Government Board, and the panel point out that it is "a great and difficult undertaking, which will only be practicable if careful preparations on an adequate scale are made beforehand. If our estimate is correct it will mean the equivalent of 3,000 building schemes, each consisting of 100 houses. If only one day were given on an average to each set of plans for the design and lay-out of 100 houses it would involve six months' continuous work for twenty highly-skilled responsible experts."

The panel recommend that the country should be divided into areas, and that over each should be placed a district housing commissioner, who shall be appointed by and subject to the control of the President of the Local Government Board. The first duty of the commissioner would be to check the returns of the local authority, and to decide how many houses should be built in each area. The principle to be followed in arriving at the total number to be built would be to make good the additional shortage caused by the war, and to meet the urgent needs of the country districts.

"It is understood that the President of the Local Government Board has arranged with the Royal Institute of British Architects to institute a competition for a series of type plans. It is to be hoped that great care will be taken in drafting the rules of the competition on which its whole value will necessarily depend. It is suggested that this should be done in co-operation with Sir Tudor Walter's committee, to whom the question of economy of design has been referred. But it is not enough to obtain a series of good type plans. It is essential that these should be adapted to local needs by an architect of experience and taste, and that architectural skill should be employed in laying out the building estates on town-planning lines. Comparatively few architects or surveyors have experience of this work. On the other hand, a man who had had good architectural training could, with a little coaching, soon pick up sufficient knowledge to enable him to lay out cottages on town-planning lines fairly satisfactorily. We think, therefore, that it is very important that the work should be in charge of an architect; otherwise the high standard of design and lay-out which is desired will not be secured. But unless the Government gives encouragement it is probable that but few local authorities will employ an architect; they will consider that their surveyor is quite capable of providing any professional skill which may be needed."

On the question of cost the panel points out that "it is probable that the provision of 300,000 houses would involve an expenditure in the neighbourhood of £100,000,000, and the grant in aid which it will be necessary for the State to make might amount to £25,000,000, or even more. This is a very large sum of money, and it is to be remembered that Scotland and Ireland are omitted from the calculation. In Scotland the shortage is even greater than in England, and the standard markedly lower. It would not, therefore, be accurate to take as representing Scotland's need a proportionate sum based on the relative populations in the two countries. The claims of Ireland have also to be considered, where the conditions of housing in the towns, and especially in Dublin, are notoriously bad."

COMPULSORY LAND PURCHASE.

In the House of Commons Mr. Bowerman asked whether, in connection with the Government's housing scheme, it was intended to confer upon local authorities powers for the compulsory purchase of land for housing purposes on the basis of the Government valuation of land under the Finance Act of 1909. Mr. Stephen Walsh, in reply, said a committee had been appointed by the Minister of Reconstruction to consider and report upon the defects in the existing system of law and practice involved in the acquisition and valuation of land for public purposes. That committee had made a report, but this did not deal with the question of valuation for the purposes of purchase. This matter, it was understood, would be dealt with in a subsequent report, on receipt of which the question of any alteration of the law on the subject would be considered.

ECONOMY IN PLANNING AND CONSTRUCTION.

At a meeting of the Royal Sanitary Institute to be held on Saturday, the 27th inst., at Ipswich Town Hall, a discussion on "Housing, from the Point of View of Economy in Planning and Construction" will be opened by Sir Henry Tanner, C.B., I.S.O., F.R.I.B.A. The chair will be taken at 11 a.m.

Sunderland Town Council have purchased land on the Durham road for an extensive housing scheme.

Seaham Harbour Urban District Council are recommended by the Health Committee to build 153 houses after the war.

The borough surveyor of Newark, Mr. T. P. Frank, has been instructed to prepare a housing scheme on two separate sites.

The Local Government Board have sanctioned, when Treasury restrictions are removed, the borrowing of £11,150 for the purchase of land between Mill-lane and Love-lane, Poulton, as a site for the erection of houses for the working classes under the Wallasey Corporation housing scheme.

In default of action by the London County Council the London Labour Party have asked the President of the Local Government Board to call a conference of housing authorities in Greater London for the purpose of making arrangements for plans to be prepared for adoption immediately upon the conclusion of the war.

Dundee Housing and Town Planning Committee are asking the town council for power to negotiate for supplies of timber for the three housing schemes projected. Mr. Thomson, city engineer, said a sum of £60,000 was involved, and he proposed that they should in the first instance make use of the timber on the various estates owned by the corporation, and that they should afterwards buy direct from landowners. The committee decided that the operations should meantime be confined to the timber on the corporation estates, and sanction was given to the installation of sawmill machinery for the cutting up of the wood prior to its being placed in storage.

INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS.

THE ANNUAL MEETING: TOWN PLANNING CONFERENCE DISCUSSION.

At the Town-planning Conference held in connection with the recent annual meeting of the Institution of Municipal and County Engineers in London, four papers dealing with various aspects of town planning were submitted for consideration. The contributions, which we propose to produce as space permits, were as follows: "Points Arising in the Practical Pursuit of Town Planning," by A. H. Campbell, M.INST.C.E., burgh engineer, Edinburgh; "The Official and the Housing and Town Planning Act, 1909," by J. W. Cockrill, M.INST.C.E., borough surveyor, Great Yarmouth; "Regional Planning," by D. M. Jenkins, ASSOC.M.INST.C.E., borough engineer and surveyor, Neath; "City of Birmingham Arterial Roads Improvement," by H. E. Stilgoe, M.INST.C.E., city engineer, Birmingham.

Mr. E. MORRALL (Stretford), in moving a vote of thanks to the authors of the four papers, remarked that Mr. Stilgoe had done pioneer work in the practical application of the principles of town planning. His two completed schemes and two other schemes in a more or less complete state represented in the aggregate some 55,000 acres of land, an acreage equal to four or five good-sized towns. He noticed that Mr. Stilgoe quoted Sec. 55 of the Birmingham Act, 1903, *in extenso*, but he was glad that gentleman did not claim originality or any merit for this claim, because as a matter of fact the same or a better clause appeared in twelve distinct bills in the same year. In his own comparatively small town they were fortunate enough to secure the clause the following year, plus the principle of betterment.

Mr. F. TURNER (Morley) had no doubt that Mr. Stilgoe would be able to give a good reason for the omission of the important proviso of the betterment with the improvement of the streets within the developed portion of the city, and no doubt he had obtained it in relation to the new portion yet to be developed under his town-planning scheme. Mr. Davidge showed that the principle obtained even so far back as 1666 and 1670, when owners of property abutting upon streets to be improved or to be opened out were expected to be rated.

Mr. NORMAN SCORGIE (Hackney) remarked that the engineers of the Metropolis had little opportunity of going into the question of town planning.

Mr. H. YORK (East Barnet) said there was rather a tendency to take it for granted that a man should not have any right of ownership in land which they began to town plan, and that every consideration to the former should be swept aside. It occurred to him that town planning was a business proposition and the only way of carrying through a business proposition was by means of give and take. It would be a most arbitrary thing for any authority to say they reserved that land for a recreation ground, because presumably the owner was not to be paid, but was to give up the land for the benefit of the community.

Mr. A. J. PRICE (Lytham) complained that there were too many forms and too much administrative work before they reached the actual lay-out of the land. He agreed that regional planning was very necessary, because small authorities would not consider the expenditure of large sums of money on the making or widening of roads to connect one town with another without assistance from some one else. There would have to be some other authority for that purpose, but he suggested that the local authorities should be consulted when these larger bodies were formed, as they could not leave it to the county councils.

Mr. J. JULIAN (Cambridge) considered they should draw a distinction between town planning and the building of the area planned. They should maintain their rights over the main roads and some of the secondary roads, while the detail work of filling in the individual estates could well be left to a later date.

Mr. A. C. JAMES (Grays) said if land was to be bound up for a number of years it was essential that everyone who had to deal with the land should know that it formed part of a town-planning scheme. The point raised by Mr. Jenkins of regional planning was very necessary. In his district they wanted to insert in their plan a new means of through communication with London, but an adjoining authority would not join with them, and the Local Government Board cut out that portion of their scheme.

Mr. H. R. ALDRIDGE (National Housing and Town Planning Council) paid a compliment to the work which the institution was doing in the matter of town planning, arterial roads and housing.

Mr. MARLOW REED (Middlesex County Council) said he would like in this time of flux to feel that they came to a new spirit, and were going forward with their work *qua* engineer, not considering what stood in their way, but prepared to overcome any obstacle. Mr. Campbell went to the root of the matter when he said they must get the land at its proper value.

Mr. E. G. MAWBEY (Leicester) was much struck by Mr. Campbell's common-sense argument that they needed improved powers for the purchase of land. In Leicester, instead of trying to determine what areas ought to be included in a town-planning scheme, they had proceeded on the lines of seeing what improvements were required in arterial roads. They had also prepared plans for a ring road round Leicester.

The PRESIDENT having thanked the authors for their papers, the meeting adjourned.

TO-MORROW'S MEETING AT BRADFORD.

A North-Eastern District meeting of the Institution of Municipal and County Engineers will be held at Bradford to-morrow (Saturday).

PROGRAMME.

3 p.m.—Meet in the council chamber at the Town Hall, Bradford.

Receive report of the executive committee in regard to—(*a*) Letter from Mr. Jas. Graham *re* proposed course of lectures on town planning and civic design; (*b*) Procedure as to the election of the executive committee; (*c*) Road stone control. The discussion on the housing question opened at the Leeds meeting will be continued. The district chairman (Mr. F. W. Spurr) will preface with a few remarks upon "The Development of Sites and Types of Houses," and Mr. W. E. H. Burton, ASSOC.M.INST.C.E. (member), engineer to the West Riding Asylums Board, will introduce the subject of "Materials and Construction."

5 p.m.—Afternoon tea, by kind invitation of Mr. W. H. S. Dawson, city engineer and surveyor, Bradford.

Tramways and Light Railways Association.—The tenth annual congress of this body will be held on Friday, July 12th. No papers will be submitted, but discussion will be invited among the members upon the questions of national industrial councils, increased wages, increased fares, restrictions of coal consumption, and the supply of materials after the war.

Road Deterioration in Hailsham Rural District.—In his report for 1917-18, the surveyor, Mr. G. B. Fairchild, states that, in consequence of the heavy deficiency in the deliveries of road material, the condition of the roads in the Hailsham rural district has generally become bad as compared with normal times. This deterioration, he says, is more real than apparent. The wearing period of a "metalling" has averaged about twelve years in the district. The bad places are those that have gone beyond the time when remetalling has become necessary. All the other portions of the roads, no matter how good, have annually become one year nearer to the same condition. Mr. Fairchild points out that labour and materials have advanced in cost over 60 per cent, and that to reinstate the roads to pre-war standard, or even to stem their downward decadence, will require an enormous expenditure.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

ARCHITECT.—July 8th.—Rhymney Urban District Council. For the erection of 150 houses.—Mr. W. H. Trump, clerk, 57 High-street, Rhymney.

SURVEYOR.—July 8th.—East Preston Rural District Council.—£173 a year.—Mr. A. Shelley, clerk, Littlehampton.

SANITARY INSPECTOR.—July 15th.—Geirionydd Rural District Council. £107 10s. per annum.—Mr. T. Hughes, clerk, Union Offices, Llanrwst.

SURVEYOR.—July 15th.—Yeovil Rural District Council.—Mr. Mervyn H. Rodber, clerk, The Chantry, Yeovil.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

DUNDALK.—July 8th.—Repairing eighty-one labourers' cottages.—Mr. Peter Cahil, Francis-street, Dundalk.

WELLS.—July 15th.—For rebuilding a small bridge.—Mr. O. W. Berry, engineer and surveyor, Poor Law Offices, Wells.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. JULY 12, 1918. No. 1,382.

Minutes of Proceedings.

Birmingham Arterial Roads.

In accordance with the intention expressed in the minute which appeared in our last issue on the papers read at the town planning conference held in connection with the recent annual meeting of the Institution of Municipal and County Engineers, we now revert to Mr. Stilgoe's paper on "The City of Birmingham Arterial Roads Improvement." The scheme, the broad outline of which is no doubt familiar to many of our readers, is really the outcome of a thorough and far-sighted consideration of the modern traffic requirements of the city. Having regard to the increase in the volume and weight of mechanically-propelled traffic of all kinds, and bearing in mind the immense sums that have been spent in past years on street improvements, it became apparent to those advising the corporation that, in addition to improving existing main radial roads and planning new ones, the traffic problem of the future required for its satisfactory solution the construction of ring roads. The main object of the latter is to provide convenient by-passes for through traffic, which would otherwise have to pass through the centre of the city; but they would also have the incidental advantage of providing inter-communication between suburban districts in course of development. It would obviously be impracticable to carry out the whole of a scheme of such magnitude at one time, but upon the long view taken by its framers this fact affords an argument in its favour rather than against it. To use Mr. Stilgoe's words, it is a progressive scheme in a constructive sense, and it is at the same time a preventive measure, inasmuch as new buildings must conform to the prescribed frontage lines. For the future prosperity of a great commercial city like Birmingham such a scheme may without exaggeration be said to be a necessity, for its development will be to a great extent limited by the ability of its main roads to deal with the traffic requirements of its industries. The corporation are to be congratulated on the manner in which a large and complex problem has been tackled, and Mr. Stilgoe upon the courage and foresight which he has displayed and the example he has set by the scheme to other cities which have similar questions to face.

* * * *

Housing and State Aid.

The recent announcement by the President of the Local Government Board of the decision of the Treasury as to State financial assistance for after-war housing has been supplemented by a memorandum of the Advisory Housing Panel of the Ministry of Reconstruction which, under the chairmanship of Lord Salisbury, has been considering the conditions of housing in England and Wales as an emergency problem. This memorandum—a summary of which was given in our issue of last week—deals in the first place with the Act of 1915, which placed restrictions on increases in the rents of small houses. This Act was passed as a war emergency measure, and, unless the present shortage of houses is remedied by municipal building, it is evident that its repeal would inevitably lead to a general advance in rents; on the other hand its continuance would directly discourage building by private enterprise. It is fortunate therefore that this dilemma will be avoided by the Government scheme. The most important part of the memorandum, from one point of view, is that which contains a recommendation that for the purpose of the Government scheme the country should be divided into areas, over each of which should be placed a District Housing Commissioner, to be appointed by the President of the Local Government Board, and to whose staff there should be appointed a competent architect to be selected from a panel of local architects. It is suggested that the first duty of the District Commissioner should be to check the returns of the local authorities in his district and to decide how many houses should be built in each area. While it is evident that Government financial assistance necessarily involves some measure of State control, it would on the other hand appear to be desirable, if the recommendations contained in this memorandum are to be carried into effect, that steps should be taken to insure that the legitimate activities of the local authorities are not unduly interfered with, and to this end we suggest that developments should be closely watched.

* * * *

Housing Sites and Materials.

At the North-Eastern District meeting of the Institution of Municipal and County Engineers which was held at Bradford on Saturday, an interesting discussion took place on matters connected with housing development. Mr. F. W. Spurr, the city engineer of York, opened upon the subject of sites and types of dwellings, while Mr. Burton, the engineer to the West Riding Asylums Board, spoke more particularly with regard to materials and construction. We quite agree with the points made by Mr. Spurr that sites can be most easily and satisfactorily developed if the contour of the ground is taken as the guiding factor instead of attempting a purely geometrical plan; that the planning of housing sites should be considered whenever possible in conjunction with a general town-planning scheme for the district; and that road construction should be reduced to a minimum. The discussion on both papers was essentially useful and practical, and although Mr. Burton's decided opinion as to the future of brick as a standard material met with some criticism, his other conclusions seemed to meet with general acceptance. Perhaps the most noteworthy of these was the opinion that while the shortage of timber lasts there is likely to be a considerable increase in the use of Portland cement, and that it is unlikely that reinforced concrete will be used to any great extent in the construction of dwelling houses, as its application would necessarily be on too limited a scale to produce economical results on the outlay.

* * * *

Forthcoming Meetings.

It was evident from the announcements made at the annual meeting of the Institution of Municipal and County Engineers that Mr. Hayward's year of office would witness a return to something like the pre-war programme of meetings. In pursuance of this policy two gatherings of considerable interest are announced for the present month. At the first, which is to be held at Stretford on Friday and Saturday of next week, Mr. Ernest Worrall, the engineer and surveyor, will submit a paper descriptive of the public works of that town for discussion by the members of the institution. The programme of visits arranged for those attending this meeting is exceptionally interesting, as, in addition to inspecting the various works mentioned in the paper, excursions will also be made to the respective works of the Ford Motor Company and the British Westinghouse Company. A week later a meeting will be held at Maidstone, when three papers will be read. The first, by Mr. Bunting, the borough engineer, will deal with the municipal works of the town during the last quarter of a century; while Mr. Chapman, the county surveyor, will speak on Kent roads before, during and after the war; and Mr. Hoadley, the borough electrical engineer, on the borough electricity works. At this meeting, too, an interesting round of visits has been arranged. It is to be hoped that those who have made the arrangements will be rewarded by a full attendance of members.

* * * *

Roads and Bridges Control.

The announcement is made that Lord Montagu of Beaulieu has given notice of a series of eight questions to the Government on this important question. In essence these will inquire whether it is proposed that the newly-appointed Controller of Roads and Bridges in the United Kingdom, who is a military officer, shall

control the construction, maintenance and management of all roads in the kingdom; whether he has had any experience of road construction, traffic management, or local government; whether the Road Board, the County Councils Association and local authorities, county and borough councils and district councils now responsible by law for road construction and maintenance have been consulted; whether there is any intention of suspending or abolishing the Road Board or of continuing military control of roads and bridges after the war; and what statutory authority, if any, the new military Controller possesses enabling him to interfere with and override the considered policy and wishes of local authorities, and whether any special legislation is proposed to authorise interference with roads and bridges now maintained almost wholly by the ratepayers.

A ROAD BOARD APPOINTMENT.

MR. WENDT'S POSITION.

The case of Mr. Wendt, the Road Board official in regard to whom a question was recently asked in Parliament [The Surveyor, June 21st] was mentioned in the House of Lords on Monday by Lord St. Davids, in urging that naturalisation certificates should be revoked *en masse*. His lordship is himself a member of the board, but he confessed that it was not until the question was asked in the House of Commons that he knew anything about the case. Then he demanded a meeting of the board, when they were told that this man was indispensable. He was born in Dresden, of a German father and an English mother. He came to this country at eighteen, and worked for nine years—eight of them on railways that Sir George Gibb (the chairman of the Road Board) was connected with. He never took the trouble to be naturalised. Then Sir George Gibb went to the Road Board. This man went with him, saw a chance of getting into the Civil Service, and for that he was naturalised—in 1910, the year the Road Board was formed! The Road Board was now making and mending roads for the Army, the Navy, and the Air Force, and this Mr. Wendt knew all about everything they were doing. If this man was not considered fit to go into the Army or to go into an office, he must be paid, according to the rules of the Civil Service, £500 a year for life. That was intolerable.

Lord Sandhurst, in reply, said the facts were as stated by Lord St. Davids. When Sir George Gibb went from one line of business to another—from the North-Eastern to the Underground Railway, and finally to the Road Board—he took this man with him. Mr. Wendt had attested under the Derby Scheme and had made three or four applications to be allowed to join up, but was considered indispensable. He had since been declared not to be indispensable, and he would shortly be called to military service. ("Hear, hear.")

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

TAR-SPRAYING.

To the Editor of The Surveyor.

Sir,—I have pleasure in briefly replying to your correspondent "Sunken Roads of Picardy." [The Surveyor, June 28th, p. 460.]

The answer to his first question is in the negative, with the exception that horse and similar droppings are removed.

The answer to the second query is (1) Clare's "Tarco." (2) This is the first season that this apparatus in combination with the patent nozzle described in my brief article has been used, therefore the life of the tar-spraying cannot accurately be given: but from all appearances, comparisons and expressed opinions, the life will be quite as long as the tar-spraying done by other methods.

If your correspondent desires, I daresay that a practical demonstration of the capabilities of this spraying nozzle could be arranged, which would certainly do no harm to the "sunken roads of Picardy," and probably prove economical to the nation.

I have been informed, I might say, that on Thursday last, in the presence of an expert in the application of tar to roads, this apparatus sprayed over 1,600 sup. yds., and three men chipped the same in one hour on a road that had not previously been tar-painted.

Whether the men are descendants of Hercules or of Samson I do not know—I was not sufficiently interested in their genealogy to inquire; but a demonstration would, I think, also show that the work of spreading the chippings is not the hard and laborious task that your correspondent suggests.
—Yours, &c.,

Percy Morris.

Leigh, Lancs.
July 8, 1918.

THE HORNSEY METAL SALVING SCHEME.

DETAILS OF PROCESS.

A sub-committee of the Southend Town Council have paid a visit of inspection to the plant installed at the Hornsey Corporation works department for dealing with the tins and scrap-iron salved from house refuse. The visitors, including the acting borough engineer of Southend, were received by Mr. E. J. Lovegrove, borough surveyor of Hornsey, who explained the process, which is briefly as follows:—

Upon the refuse being delivered at the destructor, it is shot on to the tipping floor. All metal waste is then taken from the refuse and sorted into three classes—(*a*) galvanised iron goods, (*b*) tinned iron goods, (*c*) enamelled iron goods. The tinned material is passed into a chamber, the cover of which is on the level of the tipping floor. While in the chamber the gases from the refuse destructor flue are brought into contact with the metal, which becomes thus oxydised. In addition to removing the tinned coating, the solder from the tins drops through the chamber into a receptacle and is recovered. The tins are then drawn from the chamber on the ground floor, taken to an adjoining shed and pressed into bales measuring 27 by 15 by 6 in. of about 1¼ cwt. each. The press used is a hydraulic press manufactured by Messrs. Hollings & Guest, of Birmingham. The other metal waste which does not require to be oxydised is similarly pressed into bales. The Hornsey borough surveyor estimates that a profit of between £1 and £2 per ton is realised according to the class of material, for which he finds there is a ready market.

As a result the acting borough engineer of Southend has been instructed to prepare a tentative scheme for the consideration of the committee on similar lines to the Hornsey scheme. The sub-committee also took the opportunity of inspecting roads which had been constructed at Hornsey with bituminous material. Samples were shown of sieved and graded clinker in the laboratory, and Mr. Lovegrove explained his system of dealing with the clinker as a filler for "asphalt" roads and also in the making of slab paving. Mr. Lovegrove was cordially thanked for his kindness and for the information he had conveyed.

BELFAST SEWAGE CONTRACT ANNULLED.

The Chancery Division of the Irish Court recently considered an application under the Courts (Emergency Powers) Act, 1917, for an order annulling a contract entered into by Messrs. J. and R. Thompson, Limited, contractors, with the Belfast Corporation for the construction of a ferro-concrete sewer, one mile long, running out from the County Antrim side of Belfast Lough over sloblands. The contract price was £63,697, which included £5,000 for contingencies, and the work was to have been completed on April 2nd, 1915. Great difficulty was experienced in carrying on the work owing to want of labour and materials, and, finally, in October, 1916, the Ministry of Munitions refused to allow the work to proceed any further. At that time a considerable amount of the work of a permanent character had been completed. The contractors had spent £25,469 7s. 4d., and had been paid £8,340. The contractors now asked that the contract should be annulled and that they should be paid for the work they had done.

The corporation asked that the contract should only be suspended for the duration of the war, or, if it was annulled, that that should be done on terms. To make a new contract for this work after the war would probably entail an expenditure of an extra £80,000, and they submitted that they should not be asked to bear the burden alone.

Mr. Wilson, for the contractors, at the adjourned proceedings, said the parties had been in consultation, and the matter was now reduced to a very small compass. The figures of Mr. Cutler, the borough engineer, had been accepted as to the value of the work executed, and on that head a sum of £10,254 14s. 3d. had been agreed upon. The contractors had been paid £8,340, which left a balance of £1,914 14s. 3d. due. It had also been agreed that the contractors should get £4,543 5s., value of the plant taken over by the Government, and lodged on deposit receipt in the joint names of the applicants and the corporation. There were, however, two items in respect of which Messrs. Thompson thought they should be allowed something extra. The most difficult part of the work had been carried out by them at the average contract price, and some allowance, it was thought should be made with regard to that.

Mr. Justice Ross ruled that the contractors were entitled to an extra £1,000. He accepted the other figures agreed upon by the parties, and embodied them in his order annulling the contract. As to costs, the parties would turn back to back.

The Editor will be glad to receive copies of annual and other reports dealing with matters of interest to "Surveyor" readers.

The Development of Housing Sites and Types of Dwellings.*

By F. W. SPURR, City Engineer, York.

As the desired reforms with regard to housing in the future appear to be obtainable only where town-planning schemes are adopted, it should be the duty of every local authority to put in hand as early as possible a town-planning scheme for their respective districts.

I suggest this is necessary before a scheme for housing can be properly prepared, because I submit housing in the future will be developed on town-planning lines and in accordance with a well-thought-out scheme, providing for traffic roads, playing fields, allotments, shopping centres, industrial areas, &c. &c.

Sites will be most easily and satisfactorily developed if the contour of the ground is taken as the guiding factor instead of attempting a lay-out on geometrical lines, and for the purposes of planning I submit that an accurate plan of the site showing contour lines at elevations suitable to the locality is essential. From such a plan a lay-out can be easily drafted without the use of cross sections.

ROADS.

Road construction should be reduced to a minimum, abolishing back roads wherever possible, and roads for access to residential areas should be made only wide enough for the casual vehicular traffic that would require to use them. Through roads or arterial roads will require to be of ample width between fences, and here again only sufficient carriageway should be made up to accommodate present-day traffic. With regard to the construction of carriageways (reduced to minimum width, of course) for both arterial roads and roads in residential areas, I maintain that these should be strong enough to carry heavy traffic, and I do so because the time has come when heavy motor vehicles are being used for furniture removal, making it necessary for such vehicles to get as close as possible to the house to which the furniture is being taken or being removed from. We have been told on many occasions that gravel roads were quite sufficient for the traffic of residential areas; but I do not think many here hold that view.

BUILDING LINES.

The distance between building lines will vary considerably and will be sometimes ruled by the physical conditions on the site. I think no fast rule can be admitted, and I do not think it necessary if the number of houses per acre allowable is in the region of, say, from ten to twelve. The widths for new arterial roads can be fixed only with a full knowledge of the district, and must vary according to traffic requirements of the present and the probable traffic of the future. It would be the safer plan, however, to err on the side of too much width rather than too little.

Building lines should be sufficiently broken for the purpose of architectural effect, and sites terminating vistas at important centres should be reserved for churches, chapels, public buildings, &c. Whatever buildings are erected on those particular sites such buildings should receive special attention architecturally, so that the combined result of laying out and architectural design is pleasing and satisfactory.

Anything in the way of a brick wall should not be permitted at the fronts of the houses. I think wire or rustic wooden fences with privets planted close up to them are to be preferred both from the point of cost and effect.

The provision of allotments in close proximity to houses should receive careful consideration, and it will in many cases be found the most satisfactory manner of utilising the open spaces available behind or between blocks of buildings.

OPEN SPACES AND TREE PLANTING.

Of course playing-fields will have to be provided, and I think it would add very much to the comfort of the citizen if these could be arranged in positions sufficiently far enough away from houses. On the other hand, they must be convenient of access for the children; otherwise the street will be preferred. In this connection I am of opinion that playing-fields should be under the supervision of a caretaker or supervisor, who will take an interest in the children and their games. Efficient attendants will require to be very carefully selected for this work.

Amenity of the district must be carefully considered, and for this purpose trees and objects of interest should be preserved as far as possible. Belts of trees should be provided where it is desirable to screen works or ugly buildings.

TYPE OF HOUSE.

The type of house to be erected must of necessity vary with the requirements of the locality, and it may be that in some districts special provisions will be called for to satisfy the needs of tenants engaged in particular employments, and rural cottages will require to be designed to meet rural conditions.

The cottage of the future I suggest should be designed with a wide frontage in place of the narrow frontage with the objectionable projection at the back in the form of a scullery with small bedroom over, a form of construction most effective in shutting out both air and sunshine from the principal rooms at the back of the house and those as a rule mostly used.

I think the most satisfactory cottage will prove to be the one without projections in the form of outbuildings; but where these projections are unavoidable the height and width should be the minimum.

Bedroom accommodation will vary, and I think the cottages with three and four bedrooms will be those most required. Cottages with two bedrooms might also be provided for couples without family, and smaller ones with only one bedroom might be necessary for housing old couples.

The two types of cottages that will be in general demand will be:—

1. The type providing large living-room and scullery and three or four bedrooms, with of course the other necessary offices, including bathroom.
2. The type providing living-room, scullery and parlour, with other accommodation as above mentioned.

Personally, I think both types are needed, the former where the family is young, and the latter where the elder children require a retreat for study or for the purpose of entertaining young friends. The number and proportion of each type will have to be ascertained as far as possible by inquiries in the district.

BATHROOMS.

I think it will be agreed that bathrooms must be provided in all cottages of the future and that a supply of hot water is a necessity.

Bathrooms should be placed on the bedroom floor level in the larger cottages and a hot-water supply provided. The hot-water storage cistern should be arranged in a cupboard to be used for drying or airing clothes. In cases where the bath must be on the ground floor it should be placed in a small cubicle and supplied with hot water from an open elongated fire back boiler. This method of hot-water supply has proved very satisfactory in a number of cottages erected by the York Corporation. It is essential that a hot-water tap be placed over the sink.

It would be a boon to householders if some practical scheme for central hot-water supply to cottages could be devised. Something might be done in conjunction with a central wash-house, and circulating pumps might get over the difficulty of maintaining a supply through long lengths of pipe.

All rooms should be designed with a view to the accommodation of the furniture they will have to receive, and in like manner the scullery should be carefully designed so as to provide for the usual appliances of a scullery, particularly the wringing machine. Cupboard accommodation should be ample and should be carried up to the ceiling. Provision is necessary for gas cooker and gas copper, and see that the sinks (where perhaps most work in the scullery is carried out) are well lighted. The latter remark applies to all rooms and staircases.

* Paper read at a North-Eastern District meeting of the Institution of Municipal and County Engineers at Bradford.

Halstead Council Surcharged.—The Local Government Board auditor has disallowed a sum paid for coffee and milk for German prisoners employed by the Halstead, Essex, Urban District Council on the sewage farm.

Municipal Work at Auckland, New Zealand.—Auckland City, in spite of the disabilities imposed by war conditions, continues to progress. The population of Greater Auckland—that is, including the suburban districts—is now nearly 140,000. The principal works claiming the attention of the city council at the present time are the eastern outlet, paving schemes, various extensions of the sewerage system, and the construction of the Nihotupu waterworks reservoir, in connection with which a concrete gravity dam, 143 ft. high, to impound 540,000,000 gallons of water, is being constructed by contract under the direction of the city engineer, Mr. W. E. Bush, M.INST.C.E., in the Waitakerei Ranges, from which Auckland's water supply is at present drawn. The new city market buildings have just been completed from Mr. Bush's designs, at a total cost of £50,000, including the provision of a large convenience for both sexes. The market buildings proper consist of two buildings, the larger of which is 460 ft. long by 130 ft. deep.

Institution of Municipal and County Engineers.

NORTH-EASTERN DISTRICT MEETING AT BRADFORD.

A North-Eastern District meeting of members of the Institution of Municipal and County Engineers was held at the town hall, Bradford, last Saturday afternoon. Mr. F. W. Spurr (York), district chairman, presided, and there were also present: Messrs. T. W. A. Hayward (Battersea), president, W. H. Dawson (Bradford), E. Worrall (Stretford), J. P. Wakeford (Wakefield), F. Massie (Wakefield), P. Morris (Wakefield), W. T. Lancashire (Leeds), E. J. Silcock (Westminster and Leeds), T. H. Hailstone (Altofts), A. Rothera (Spenborough), J. Southwart (Rothwell), H. Bottomley (Bingley), W. E. Parker (Keighley), J. E. Aldersley (Earby), H. M. Driver (Tadcaster), H. L. Hall (Batley), J. Saville (Heckmondwike), W. Dixon (Leeds), G. A. Waite (Ilkley), H. Dearden (Dewsbury), P. Marsden (Bradford), S. Sutcliffe (Mytholmroyd), T. Webster (Bradford), and W. E. H. Burton (Wakefield), hon. district secretary.

The Chairman said their first duty was to welcome the president, as it was very rare that he was with them at their North-Eastern District meetings. They also welcomed Mr. Dawson, the city engineer of Bradford, who had become a member of the institution. Mr. Dawson had attended many of their meetings, and when asked if they might meet at Bradford, Mr. Dawson at once agreed.

Mr. Dawson offered the members a very hearty welcome to Bradford. Owing to previous engagements, the Lord Mayor of Bradford and Councillor E. J. Smith (the indefatigable chairman of the committee having the housing question in hand) were unable to be present. He wished to express his personal gratification that the newly-elected president had been able to come all the way from London to take part in the proceedings that afternoon.

The minutes of the last meeting were received and other formal business transacted. It was announced that Mr. Spurr had been elected chairman of the executive committee, and Mr. Rothera vice-chairman. It was hoped the next meeting would be held at Middlesbrough or at Morley, and the opinion was expressed that York would be a very desirable place at which to meet in the near future, although the chairman said he was afraid he would not have much to show them in that city.

The President said that a meeting in York would be appreciated by the members of the institution generally.

HOUSING SITES AND TYPES OF DWELLINGS: MATERIALS AND CONSTRUCTION.

In continuation of a discussion on the housing question opened at the previous meeting of the district—held at Leeds—Mr. Spurr submitted a contribution dealing with the development of sites and types of houses,* and Mr. W. E. H. Burton, engineer to the West Riding Asylums Board, introduced the subject of materials and construction.

Mr. Wakeford proposed a vote of thanks to Mr. Spurr and to Mr. Burton for the excellent remarks they had put forward for consideration. The papers would give them a great deal to think about, and, as far as he was concerned, they would be of great assistance to him. He was pleased with the remarks about one and two bedroom houses. He felt somewhat keenly on this subject, especially in view of the pronouncement of the Local Government Board that houses should have at least three bedrooms. He could not see why that should be the case. Six years ago they had a scheme passed at Wakefield for one and two bedroom houses. He did not know why he should not go further than that, and plead that a large combined room should be allowable. Where they had an old couple living alone, he did not see how they could require more than one bedroom, for this would be sufficient for all their requirements. He would like to get at what the real objection was to one and two bedroom houses—he would like to get at what was at the back of the mind of the Local Government Board in respect of this matter. Mr. Burton's notes were most helpful, particularly his suggestion about using disused wire ropes for reinforced concrete. He had found these old ropes excellent in connection with concrete floors for filter beds, and also for granite-sett paving. It did not matter how they threw them down.

Mr. Dawson seconded, and expressed his appreciation of the suggestions made both by the chairman and by the hon. secretary. But in all these things circumstances altered cases. Mr. Burton seemed to have an artist's love for the pictorial effects of brick. Bricks did not look very picturesque when they were covered with grime. They had stone buildings in Bradford which were a perfect disgrace, but they were infinitely more picturesque than they would have been if they had been built of brick. One of the great faults in the Model By-laws of the Local Government Board was that they dealt with a town or city built of brick. In many cases they were quite out of joint with the general conditions of the district. Mr. Burton came from Wakefield, where the conditions differed very much from those at Bradford. They could not make one set of by-laws applicable to every particular town or city. As he very properly observed, they had to take into consideration the materials which could most readily be found in the particular district in which they were working. From a strictly technical point of view Mr. Burton's paper was most excellent, but how he was going to build houses for occupation by the working classes on that basis at an economic rent he failed to understand. In giving a few figures as to the cost of certain work, Mr. Burton had very properly safeguarded himself by saying that they were pre-war rates. But when were they going to get back to pre-war times? Never, in his opinion! He did not think the cost of materials or of labour would ever again be what they were before the war. The chairman, in his paper, held that a bathroom was necessary. He was not quite sure that a bathroom was necessary, although a bath certainly was. Baths were sometimes fixed in very curious places. He once had an application from a man who wanted to fix a bath level with the kitchen floor, the idea being that whenever he wanted a bath he could simply take off the lid and go through the process in front of the fire! (Laughter.) The man was disgusted when told that there might be difficulties in the way of carrying out his proposal. Rooms should certainly be designed with a view to the shape of the furniture that was likely to be placed in them. With regard to walls, after practical experience he had come to the conclusion that it was impossible to make them perfectly damp-proof if they were built perfectly solid. He did not believe in making clinker mortar and cement, as it was porous, and he had proved that when clinker was used water could get through. He was an advocate of standardisation, with certain qualifications. He did not mean that they were going to build standardised houses for people like rabbit-hutches or rows of cabbages! He said—standardise everything used. They could not standardise stone like they could brick, but there was no reason why they should not have a series of standardised window and door frames. They could have standards one, two, three, and so on. If they were going to build houses suitable for the working classes, at an economical rent, they would be bound to cheapen the cost of construction as much as they possibly could. The housing question was very much affected by the cost of the land. He knew of some cases where as much as 10s. and 12s. per yard had been given for land upon which to erect dwellings suitable for occupation by the artisan classes. That was a big price, and the result was that they had to build back-to-back houses and overcrowded the land—they had to build forty-seven houses per acre, whereas the number now suggested was about twelve per acre. Practically they had four houses crammed down on the land which only one house ought to occupy. As to the papers that had been read, it must have taken a considerable time to prepare them. Very often it might seem that there was not very much in a paper that had been read, but that was never the opinion of the man who prepared it! (Laughter and applause.)

Mr. Wakeford said that in reference to the remark regarding pre-war costs, his assistant, Mr. Morris, had compiled some interesting figures during the past few days on the subject, which he was prepared to lay before them.

The Chairman said it was intended to have the figures printed, as they would be very useful to everybody.

Mr. Morris said he had worked out the percentage of cost of each trade connected with the erection of a house, and found them to be as follows: Bricklayer, 49 per cent; joiner, 26; plumber, 13; plasterer, 5·4; slater, 4·6; and painter 2. Increased prices compared with 1914: Bricklayer, 97 per cent; joiner, 150; plumber, 120; plasterer, 110; slater, 84; and painter 52. Taking the cost of a house at £200 at pre-war rates, the cost of a similar house in 1918 would be £424, or a total of 112 per cent increase in the price of materials. Apart from the cost, there was much difficulty in obtaining many of the materials used in building cottages at the present time—*e.g.*, copper boilers and hot water cylinders. At the close of the war he thought there would be quite as great a demand for building materials as that which at present existed; therefore it was reasonable to conclude that the price of these materials would not reach a lower level than they were obtainable for at present. Certainly labour would not be cheaper. It appeared to him that the only way to cheapen the cost of building a cottage would be to reduce the size of the cube and change the method and construction and form of the materials. A comparison of present prices showed that there would be but little saving effected by using reinforced concrete. The greatest increase was in the price of timber and finished joinery, so that it followed that the greatest saving would be

* See p. 15.

effected by reducing the use of these materials. Flat concrete roofs would be much cheaper than slate or tile.

The President said he would like to associate himself with the vote of thanks, for he had found the meeting particularly interesting. In London of course they did not get the opportunities for town planning, although it was a subject he could take much interest in if he had the opportunity. In London they were much concerned with the actual building of workmen's dwellings. With regard to one and two bedroom houses, these were very popular in his own district. In Battersea they had built a number of two-room tenements—living room and bedroom, and never since these had been built had they stood empty. Whenever one was vacant, there were three or four people on a waiting list ready to come in, which showed that these houses really satisfied a need. There was a bathroom and scullery in connection with each of these tenements. He believed in the bath, but would not say so much about the necessity for a bathroom. They had in all cases put the bath in the scullery, where it took up less space that could otherwise be profitably used. They could not put the bath in the bedroom, neither could they put it in the living room, while they could not provide a room specially for the purpose. As to the comparison of building costs, it was difficult to arrive at proper conclusions, as local conditions varied so much. He was interested to hear Mr. Dawson challenge Mr. Burton's ideas as to brick versus stonework. That was the sort of discussion they wanted to arouse, and he would support both gentlemen. He lived for many years in Bath, which was a beautiful city of stone. But in the suburbs of many Lancashire and Yorkshire towns they might see really beautiful houses built of brick. He agreed with Mr. Burton that brickwork lent itself to some really beautiful designs, while no one could dispute the artistic results accruing from the proper use of stonework.

Mr. Dearden explained what was being done at Dewsbury in the laying out of land for workmen's dwellings on a principle that was not altogether on accepted town-planning lines. They had tried to get the best results under varying conditions. He had brought plans which might be of interest to some of the younger members. In drawing up their plans let them not forget that the ratepayers would have to find the money. All the same, he was in favour of using the best of everything for the houses of the workers. Inferior material might very well be used for warehouses and other purposes. In industrial districts he held it to be a *sine qua non* that houses should have at least two bedrooms. He strongly advocated a separate bathroom, and that upstairs. To put a bath in a scullery was to restrict its use, as in many cases a bath would require to be used every night.

Mr. Worrell said that in his district 250 houses were being built as an after-the-war scheme. His council held the view that two-bedroom houses should be admitted. The question had been taken up strongly with the Local Government Board, who, although they had not actually sanctioned the scheme, had promised to give careful consideration to the proposals. As to the question of cost, he followed Mr. Morris with great interest, although he believed the figures given were on the moderate side. Timber for instance had increased in price by 600 per cent, and joiners' wages by 58 per cent. The shortage of timber was most serious, and he feared it would soon become not only a question of price, but a question of the actuality of the timber at any cost.

The resolution was carried unanimously and duly acknowledged.

Mr. Burton said he was prepared for being censured when he spoke in favour of brick. Perhaps some of them did not know that he was a Bradford man himself. There was no better stonework anywhere than that to be found in Bradford, but, taking the country as a whole, he was satisfied that brick was the most suitable material to use.

The members were then entertained to tea by Mr. Dawson, after which an interesting time was spent in examining plans, &c., brought by several of the members.

We regret that, owing to the extreme pressure on our space, we are obliged to hold over the paper on "Materials and Construction," by Mr. W. E. H. Burton, engineer to the West Riding Asylums Board. We hope to be able to reproduce it in our issue of next week.

THE PRESIDENT'S THANKS.

Mr. T. W. A. Hayward writes:—

Will you grant me a little space in your valuable journal in which to express a word of thanks to those of our members and visitors who co-operated towards making the annual meetings such a success? I should like to take the opportunity of thanking my fellow members who have written me concerning the meetings. These communications are so numerous that it is almost impossible for me to acknowledge them individually. And, again, may I say "Thank you" to each and everyone who so generously responded to my appeal *re* the Orphan Fund, and especially to those two members who initiated the challenges? The results are as follows:—

Challenge No. 1.

	£	s.	d.
Geo. Green	5	5	0
A. E. Collins	5	5	0
J. Birch	5	5	0
E. J. Silcock	5	5	0
N. Scorgie	5	5	0
G. Marlow Reed	5	5	0
Capt. T. P. Frank	5	5	0
C. C. James (£1 1s.), G. W. Humphries (£2 2s.), Anonymous (£2 2s.)	5	5	0
F. Massie	5	5	0
Anonymous	5	5	0
	£52	10	0

Challenge No. 2.

	£	s.	d.
Geo. Green	5	5	0
A. E. Collins	5	5	0
S. W. J. Barnes	5	5	0
F. W. Goodenough	5	5	0
Collection taken at N.E. District meeting, July 6th	5	5	0
J. W. Cockrill £2 12s. 6d.), R. H. Bicknell (£2 12s. 6d)	5	5	0
C. H. Cooper (£2 2s.), R. H. Johnson (£2 2s.), A. H. Campbell (£1 1s.)	5	5	0
T. Caink (£1 1s.), Sir J. Lemon (£1 1s), H. H. Humphries (£1 1s.), E. Roberts (£1 1s.), Mayor of Battersea (£1 1s.)	5	5	0
Anonymous	5	5	0
Anonymous	5	5	0
	£52	10	0

Total.

	£	s.	d.
Challenge No. 1	52	10	0
Challenge No. 2	52	10	0
Collection taken on board the launch "Viscount" on June 22nd	10	0	0
Proceeds of "Dutch" auction of volumes of "Proceedings"	17	1	0
Sale of tickets for visits	29	3	0
	£161	4	0

May I add the fund is not closed, my target being £200? Any further donations will be gratefully received.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Are not the Lord Mayor and the members of the city council of Cardiff to be congratulated on their prompt action in setting an example to the citizens by themselves engaging in cleaning the streets of the city in order to clear away an accumulation of rubbish due to a strike of the municipal workmen? Is not example a great deal better than precept, and could not this action of the civic authorities of Cardiff be copied by other bodies who apparently prefer talk to action?

* * * *

Was there not a rather remarkable letter in the *Times* of July 4th from "33 Acres," who stated that "there were sixteen Government officials with a huge tractor all at one time on this holding just for the baling of a stack under 9 tons"? What would happen if a municipal surveyor were to conduct the affairs of his council in this manner, and what would the ratepayers say to this egregious waste of money? Is this not on a par with a case the other day when the manure from a large barracks was dumped on to a golf course instead of being taken to the allotment holders who had clamoured for it?

* * * *

Is it not to be hoped that when the time comes for seriously considering how we are to employ our discharged soldiers, any department or committee that may be formed will consist largely of engineers, and that many of these will be municipal engineers? Is it not evident that the problem could be tackled better by practical men of this description than by visionaries or politicans? Is it not often found that the glib talker can get a job on a commission or a committee, while the quiet practical worker is left out in the cold?

* * * *

Should not everyone interested in tar-spraying read the account given in The Surveyor of June 14th by Mr. Percy Morris, surveyor to the Leigh Rural District Council, of his ingenious and exceedingly cheap method of tarring his roads with the aid of steam generated in his road roller, which by means of a special nozzle atomises and blows the tar on to the surface of the road? Is it not very interesting to read also that this special nozzle was invented and patented by Mr. Williams, the clerk to the rural district council? Will not engineers have to look to their laurels if laymen are found to be taking such an interest in road matters that they direct their minds to the improvement of machinery for purposes of road construction?

* * * *

Is it not rather interesting to find that brick pavements in America are stated to be wearing better than formerly? Is it not evident that this is due to the decrease of horse-drawn traffic, as, whereas formerly the iron-shod hoofs of the horses broke and chipped the arrises of the bricks, the pneumatic-tyred wheels of self-propelled vehicles do not produce this effect? Is it not to be expected that as horse-drawn traffic becomes negligible the surface of our roads may be allowed to change, and that materials will be employed on their wearing merits, quite irrespective as to whether they are slippery for horses or not?

THE TRAINING OF ENGINEERS.

DISCUSSION OF MR. SILCOCK'S PAPER.

At the recent annual summer meeting of the Institution of Water Engineers, the question of the training of engineers was introduced in a paper—reproduced in our last issue—by Mr. E. J. Silcock, M.INST.C.E., F.G.S. Mr. Silcock considered the subject under two heads: First, the broader question of the education of civil engineers; and secondly, the amount of specialisation necessary for those who intend to practise as waterworks engineers. An interesting discussion followed the presentation of the paper.

Mr. H. C. Head (Winchester) apologised for the unavoidable absence of Mr. H. C. Adams, the chairman of the Joint Committtee on the Status of Water Engineers. He knew it was that gentleman's intention to be present if it were possible. He would like to say that the committee was absolutely at one with the views expressed by Mr. Silcock. At the last meeting of the committee, on May 22nd, the members had no inkling of what Mr. Silcock was going to say in his paper, but the minutes of that meeting contained the following item: "It was unanimously resolved to invite the council of the Institution of Water Engineers to consider the advisability of establishing a standard examination for water engineers on the lines already suggested for the final (practical) examination, but also including a *viva voce* test, the chairman accepting the committee's invitation to draft the terms of the letter." He (Mr. Head) believed that the institution had not yet received that letter, but, if so, it would receive a definite request in due course. He thought it was nothing short of cruelty to take a boy from a public school at seventeen or seventeen and a-half years of age and expect him to listen to lectures from 9 a.m. to 5.30 p.m. every day of the week and half-day on Saturdays. That excluded workshop practice and so-called practical work which was common in the technical colleges at the present moment, and which he (Mr. Head) regarded as valuable, not so much as teaching a boy, but as a means of giving him some mental relaxation. It was imperative that a boy who was going to live an outdoor life should be a good sportsman. What chance would a lad have of taking part in sports who was at work from 9 a.m. to 5.30 p.m.? His summer holiday was to be limited to four weeks, and in the sporting seasons he was only to have one week at a time. He was rather afraid that if they followed Mr. Silcock's advice they were going to overdo the poor boy. He was very glad that Mr. Silcock included *viva voce* examinations. If he might go a little outside the scope of the paper, he would like to say a word or two on the question of qualifications of engineers generally. The Institution of Civil Engineers seemed to have taken up the education and training of civil engineers fairly well up to a point. They had a school for studentship which was excellent, providing students' meetings where the members were encouraged to know one another. That culminated in examination for associate membership which each student hoped to pass, but when he had passed, the institution took no further interest in him whatever. The man was turned out and was told that he was qualified as a junior in the profession, but there was no definite help in order to secure his becoming a senior. He had got to obtain any further experience at the expense of clients or employers, and it was not until the man had learned his profession at somebody else's expense that the institution was prepared to take him up again and recognise him as a fully qualified member of the profession. One did feel that if possible there should be some means for carrying on the education and training of the junior engineer who had qualified as an associate member, so that he might come forward at a later date, with the assistance and knowledge of the governing body of some recognised professional organisation—either the Institution of Civil Engineers or one of the sectional institutions dealing with special branches, like their own institution, for election as a full member of the institution.

Mr. E. Willis (Chiswick) said he had been much interested in Mr. Silcock's paper. For many years he had been watching the tendency to vary the present training given to young engineers. He thought it a most fortunate thing that they had had Mr. Silcock's paper, so that the Joint Status Committee, which was now sitting in connection with the subject, should have the advantage of any opinions that might be expressed in that room. He had had the privilege of being a member of the Joint Status Committee to consider the training and conditions affecting municipal engineers and surveyors. They had had nearly thirty meetings, and they had tabulated and brought the details that were so important to be considered before the members of the Institution of Municipal and County Engineers in a concrete form, and the Joint Status Committee that had been formed to deal with water engineers should have an equally good, if not a better result. They had had a voluntary examination in the Institution of Municipal and County Engineers for more than thirty years, and over 2,000 students had voluntarily presented themselves. If the Institution of Water Engineers could arrange for a somewhat similar procedure, he thought they might start the ball rolling in a most efficient manner; but with regard to *viva voce* examinations he thought they needed something more immediately practical. They had had a *viva voce* examination for several years, but it was only within the last two years that they had instituted an immediately practical examination, devoting the whole of the day to it, and he was afraid it had shown the weakness of the students very forcibly. He hoped that in any scheme which they drew up the practical element would largely predominate. He was very pleased to hear Mr. Head refer to the importance of engineers being sportsmen; but he did not quite agree with him in his fear that the average boy would break down or become a milksop if he had to undergo the education suggested by the author of the paper. He totally disagreed with Mr. Silcock when he suggested that no attempt should be made to teach mechanical drawing to a boy of seventeen. He (Mr. Willis) thought that to teach a boy mechanical drawing was to give him a rest from mathematical and other dry subjects, and enable him to take more real enjoyment in his work. There was the question of surveying and levelling being better taught after leaving the university. To that extent he was with Mr. Silcock, but he did not quite agree with him in regard to his other remarks as to outside training. He rather thought that short practical courses were eminently beneficial, because in that way a pupil would get more refinement of detail than he would in an office. He was not quite sure whether a university training first was the right training for every boy. He had come across men who were now drawing big salaries who had started their pupilage straight from London public schools. In one case a man went straight from school into the office of an engineer, took his three years' training, and then took a year's course at the university. He worked hard while he was there, and ever since he had been jumping up and up in his profession. It was possible that that training on the sandwich principle, which was being considered in mechanical engineering, might be useful in water engineering. He did not know whether it was so, but it was a point worth consideration. He was especially pleased to notice Mr. Silcock's suggestion that the young student, when in an office, should accumulate a collection of reports and specifications, tenders, and bill of quantities.

Mr. C. T. Walrond (Westminster) said that as a member of the Status Committee he considered the paper a very valuable one. Mr. Silcock had given them many useful hints which they could adopt in the training of an engineer, and so tend to improve the status of the profession in the future.

Prof. A. H. Jameson (King's College) said that at his college, where he was an engineering teacher, they made mechanical engineering the foundation for both civil and electrical engineering, and he thought Mr. Silcock was making a mistake in suggesting that mechanical subjects should be excluded from his curriculum. Civil engineering had to do with machinery, and he believed that the Institution of Civil Engineers specified that a young engineer should spend at least one year in mechanical works before embarking on his life's work. He thought that was sound policy, and at King's College they encouraged students to go to mechanical works in their long vacations, and many of them did so, with great advantage to their education. He would like to ask Mr. Silcock why he was so keen to reduce the college course by one year. In his (Prof. Jameson's) opinion three years was little enough, considering they were dealing with boys. In America they extended the course to four years, and he thought they should think twice before they reduced it to two years here; if they did, he believed it would do more harm than good in the long run. As regarded the teaching of drawing and practical training, it was incredible to him, from his experience, that they should teach boys all these theoretical subjects without giving them some interest in the practical side at the same time. They must give a boy some practical training in illustrative and graded drawing to enable him to realise what he was learning. The course of instruction suggested by Mr. Silcock seemed to him to be a specialist course for civil engineering, as the mechanical subjects were left out except in general terms at the end.

Mr. Silcock: No.

Prof. Jameson said it seemed to him that the right thing to do was first to give the boy a good general education at a public school; at college train him as an engineer, and afterwards, when he left college, he became a civil engineer. They were talking all through as if the boy from the beginning had made up his mind to become a water engineer, but his father might have another view of his future, and the boy's tastes might not run in that direction; his special likings might be for something very different. What he wanted to emphasise was that if they decided too soon upon a boy becoming a water engineer, he might make a bad water engineer. One or two of the speakers had referred to the

question of theory *v.* practice. He thought they would all agree that what was really wanted was theory plus practice, but it had not yet been decided what the proportions should be. He quite agreed with what Mr. Head had said as to the necessity of cultivating a love of sport among their pupils and giving them something to do in the evenings which would be a thorough relaxation and a change from their lectures.

(To be continued.)

LAW NOTES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

Employee of Local Authority: Mobilisation: Dismissal: Local Government (Emergency Powers) Act, 1916, sec. 1, (1) (2).—An important point under the Local Government (Emergency Powers) Act, 1916, was decided in *Sanderson* v. *Workington Borough Council* (Chancery Division, Mr. Justice Younger, April 19th). Just before the outbreak of the war the council, as local education authority, appointed the plaintiff assistant teacher at a school, his duties to commence on August 31, 1914. He was in the Territorial Army, and being called up for service on August 4th, he wrote to the authority stating that he would be unable to take up his duties as teacher, and left the matter in their hands. In September the council passed a resolution that all their employees on military service should be paid the difference between their pay and their salaries, and that their places should be kept open for them. The resolution was not communicated to the plaintiff at the time, but in November the secretary wrote to him, stating that the council would pay their employees the difference between their pay and their salaries. In June, 1916, the council, finding great difficulty in getting teachers, applied to the military authorities to release the plaintiff. The application, however, was refused, whereupon the council passed a resolution that, from a certain date, the payments to the plaintiff should cease until he could take up his duties as teacher, and subsequently the secretary wrote to him that the council could no longer keep the post open, and terminating his employment by the usual notice. He therefore took these proceedings, in which he claimed (1) a declaration that he was still in the employ of the council, and (2) arrears of salary. The action, however, was dismissed. Mr. Justice Younger said that there was no binding contract or promise by the authority to retain the plaintiff in their employment during the war, or to keep his post open, or to make payments on account of his salary, and there was no consideration for any such contract. The case (added his lordship) did not come within the decisions in *Davies* v. *Rhondda Urban District Council* (117 L.T.R., 622), or *Budgett* v. *Stratford, &c., Society* (32 T.L.R., 378), because in these cases the employees had entered on military service on the faith of the promise. Moreover sec. 1 (2) of the Local Government (Emergency Powers) Act, 1916, did not make such a promise a binding contract, but only made it *intra vires* the authority..

QUERIES AND REPLIES.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

Party Walls.—"Star" writes: (1) An old house adjoined a garden, the gable end being one boundary of the garden. The roof was taken off and the wall lowered. There was not until lately any building in the garden. A building has now been put up. Can the adjoining occupants claim half this wall as a party wall? (2) There are two windows in the gable. Do these prove conclusively that the gable is not a party wall? (3) How does one usually decide whether a wall is a party wall or not when no maps exist?

(1) In order to support such a claim the claimant would have to prove either (*a*) that the land on which the wall stands belongs to him and the owner of the house in equal shares, or (*b*) that the wall stands partly on the claimant's land, or (*c*) that he has acquired an easement to have the wall maintained as a dividing wall. (2) The existence of the windows is not conclusive, but I think it raises a strong presumption that the wall is not a party wall. (3) When a wall between two properties has been used for a considerable time by both owners this is *primâ facie* evidence that it is a party wall. In other cases the decision will depend partly upon the ownership of the land on which the wall stands, and partly upon the question whether either owner has acquired an easement to have it maintained as a dividing wall.

Highway: Obstruction.—"Spring Bow" writes: In the rural district of X there is a block of cottages fronting upon a road leading to the station. Probably the cottages have been erected some ten or fifteen years. There is an inclined bank of grass from the forecourt wall of cottages to the water-table. The water-table is very deep, and steps were fixed to provide access to the gates; a pipe was placed in the deep water-table, with a stone slab or concrete over from the haunch of the road to the foot of the steps. In addition to this, each flight of steps has a brick ramp wall projecting beyond the foot of the bank, as shown on the section. The road is used by motor-lorry traffic to the station and beyond. Not infrequently vehicles come in contact with the projecting ramp walls, the road not being very wide. The walls are really an obstruction, and the deep water-tables prevent full use of the whole width of road; nor could metal be properly rolled in close up by reason of these projecting ramp walls; also the bottom of the water-tables was below the level of invert of the pipes; thus water accumulated there. The rural authority have taken out the pipes, cut off that portion of the ramp walls projecting beyond the foot of the bank, filled up the water-table and made a sound job of it, and are about to reconstruct the steps in a substantial manner to provide a much more convenient access to the cottages. The owner is now raising objection to the work, on the ground of interference with his property. Seeing that a great improvement has been effected by providing an easier access to the cottages, and in a more substantial manner, the objection would seem to be frivolous, and I should be glad to know the council's position in the matter.

Assuming that the obstructions were constructed after the time when the road was dedicated or adopted as a public highway, and that they were a nuisance to passengers, I think the council were justified in their action.

Extraordinary Traffic.—"H. S. L." writes: About six months ago a quarry was opened near a country road in this district, and large quantities of stone have been hauled over the road by steam lorries, doing serious damage to the road. Before the opening of the quarry, the road was used only by light agricultural traffic and was in good condition; but it has been so badly cut up by the lorries that it will now cost a very considerable sum to put it into proper repair. Will you kindly advise me whether the council can compel the quarry owner to pay for the damage?

Assuming that the traffic in question was conducted by or in consequence of the order of the quarry owner, he will, in my opinion, be liable to pay the excess of the amount which will have to be spent in repairing the damage, over and above the amount which would have had to be spent in repairing the damage done by the other traffic which used the road during the same period. See *Ledbury Rural District Council* v. *Colwall Park Quarries Company, Limited* (77 J.P., 198).

THE ARMY AND HIGHWAY BY-LAWS.

PLEA OF "SPECIAL CIRCUMSTANCES" SUCCEEDS.

At Bromsgrove on the 9th inst., William Hart, in the employ of an army department, was charged with having driven a locomotive engine with six unloaded wagons attached. Mr. G. W. Hobson prosecuted, and Lieutenant Sells, on the instructions of the War Office, defended.

Mr. Hobson stated that the object of the authorities in bringing the case forward was to show that even the military must observe by-laws, which were made for the safety of the public.

Lieutenant Sells observed there was a good deal more involved than the simple settlement of that case, because cases of a similar nature might arise. It was a particular instruction of the Headquarters that in all cases where possible the by-laws with regard to locomotives were to be observed, and it was only owing to pressure of military necessity that departure from general instructions were allowed, and then only on the instructions of a superior officer. In the case under notice the parties were engaged in the baling and removal of hay, and were working at extreme pressure for the purpose of supplying hay for the troops. Lieutenant Sells also submitted that the Crown was not liable under the Act.

The magistrates held that the plea of emergency and special circumstances had been made out, and the case was dismissed.

War Bonuses. — Bonuses have been voted by the Kidderminster Town Council to all the members of the municipal staff and the workmen in the various departments, with the exception of the town clerk and the medical officer.

Sowerby Bridge Municipal Piggery.—A municipal piggery has been established in the urban district of Sowerby Bridge, Yorks. Mr. S. Wilkinson, acting surveyor to the council, prepared the plans and carried out the work. The piggery has been built at the Milner Royd destructor works, and consists of four sties about 11 ft. by 8 ft. 6 in., with separate yards in front, also fodder-house and a cooking-house 12 ft. by 9 ft., fitted up with shelving, mixing tubs, slopstone, and a 20-gallon steam-jacketed pan to work up to 40 lb. pressure with steam from the destructor boiler, cold water being laid on to the pan and slopstone. The roof is of grey slate. The whole of the floors, including a footpath in front of the yard walls, are of concrete, and the pigsties have portions of the floors covered with wood laths for the pigs to lie on. A portion of grass land, about 80 ft. by 30 ft., has been fenced off to serve as a run. The piggery was completed about a fortnight ago, and already houses fourteen pigs which the council have purchased.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week. Other reports will be found on our "Local Government Board Inquiries" page.

BUILDINGS.

Wadebridge U.D.C.—A committee has been appointed to consider the provision of a public library and to place themselves in communication with the Carnegie Trust.

REFUSE COLLECTION AND DISPOSAL.

Hackney B.C.—The borough council have adopted a scheme for salvaging valuables from the house refuse instead of burning it. It is estimated that there will be a surplus of £4,870 the first year.

Kingston-on-Thames T.C.—It was reported that the sale of waste paper had realised £200.

Lewisham B.C.—By burning dust and refuse in a destructor instead of carting it away, the council last year saved £1,000.

Newport (Mon.) T.C.—The Health Committee recommend the corporation to purchase plant, &c., at a cost of £2,200 for utilising waste material—salving of tins, waste paper, and the treatment of condemned meat, fish, &c. Pig and poultry food is obtained from the latter. It is recommended that Newport should be the centre for Monmouthshire with the object of a co-operative scheme being formed upon terms to be arranged between the local authorities.

ROADS AND MATERIALS.

Camberwell B.C.—The council propose to sell a number of road watering vans, and have fixed the lowest price at £25 per van.

Cornwall C.C.—The county surveyor, Mr. L. D. Thompson, reports that on main roads directly maintained by the county council the expenditure during the year was £5,126 below that authorised. The principal cause of this was lack of material, labour, and horse haulage. The chairman, Sir Arthur Carkeek, thought in all the circumstances the roads of the county were in a fair state of repair. The traffic, especially by motors, was considerably reduced. He suggested that the county surveyor should ascertain what was the proportion of the use of the roads, and the cost of maintenance as caused by motor traffic, as distinct from the ordinary traffic, and this the Main Roads Committee have agreed to.

Essex C.C.—The council are making representation to the Board of Trade that on certain routes in the county the London General Omnibus Company's traffic should be immediately discontinued in view of the necessity for economy in the use of petrol and the wear and tear of the main roads.

Norfolk C.C.—The county surveyor, Mr. W. W. Gladwell, reports that the ordinary expenditure on main road maintenance last year was £57,492, an increase of £8,550 as compared with the previous year, which is accounted for by the increase in roadmen's wages and the additional cost of team labour and materials. The sum of £5,802 was expended on surface tarring of roads last season, with very satisfactory results. The schedule sanctioned by the Road Tarring Joint Committee provides for the treatment of 63 miles this season, at an estimated cost of £4,518. This work is nearing completion. The total cost per mile for ordinary maintenance was £40 1s. 3d., as compared with £34 12s. last year, and £51 7s. 2d. in 1914. The shortage of manual and team labour and the dearth of materials still present considerable difficulties. The transport of materials by steam haulage has proved that by this means they can be far more economically and expeditiously dealt with than by horse-haulage.

Perthshire C.C.—The surveyor to the Blairgowrie District Committee in his annual report stated that much damage was being done to roads by heavy timber traffic, the extra cost of repairing damage caused by engines hauling heavy loads after the first week of the thaw alone being at least £400. The estimate for the ensuing year was £8,832, against £8,321 last year.

St. Pancras B.C.—The borough council are seeking the support of other municipal authorities to a representation to the Prime Minister calling attention to the high cost of building and road materials, and requesting that steps should be taken at once to control the prices.

Scarborough R.D.C.—The council have adopted a report of the Highways and Bridges Committee recommending that a protest be sent to the county council, against the proposal that the whole of the stone allocated to the district council should be set aside for the county roads. With regard to the repair of the roads damaged by heavy traffic, it has been resolved to write to the Timber Department of the Board of Trade with respect to the question of compensation, as no satisfaction had been received from the Road Board.

Swansea T.C.—The Swansea Corporation Bill has passed the Select Committee of the House of Commons, subject to minor alterations. The main scheme provides for a considerable extension of the borough. A good deal of discussion was devoted to the opposition of the county council, on whose behalf it was stated that they desired to construct a main road between Glamorganshire and Carmarthenshire. The corporation case was that no new road was necessary, as they were bound to widen and improve the existing road in any case, and when that was done the through route between the counties would be improved by the provision of a 60-ft. road where it went through the northern part of Swansea, whereas the proposed county road still further north would be a quarter of a mile longer and only 30 ft. wide. The corporation put forward a clause to meet the county council, imposing obligations on the corporation to carry out the proposed works within five years of the withdrawal of Treasury restrictions on such expenditure, and in the event of their failure to do so giving the county authorities power to do so at the corporation expense. This proposal was in substance agreed to by the Select Committee.

West Hartlepool T.C.—The Easington Rural District Council have intimated that they could not approve the amended route of the proposed new road to the North, as suggested by the borough surveyor of West Hartlepool. The West Hartlepool Works Committee recommended that no further steps be taken by the council in the matter, but by twelve votes to ten it was decided to ask the committee to give the matter further consideration. Councillor Suggit said the West Hartlepool share of the cost of the road would be about £50,000, which was altogether out of proportion to the benefit which would accrue to the town.

SEWERAGE AND SEWAGE DISPOSAL.

Cork R.D.C.—The council have accepted the tender of Mr. Daniel Collins, Friar's Walk, at £2,189, for sewer construction at Skahabeg.

WATER, GAS, AND ELECTRICITY.

Croydon T.C.—The Water Committee have submitted to the town council *in camera* a recommendation as to the provision of an additional water supply.

Edinburgh T.C.—On Monday a considerable extension of the automatic gas public lighting was effected. In all 336 automatic lamps displace 627 lamps in use when public lighting was normal. The Lighting Committee intend to deal next with the public lighting of the Morningside and Merchiston districts, but it is proposed to convert the whole public lighting of Edinburgh where gas is the illuminant, and when this is accomplished the saving is expected to be one-half from lamplighters and consumption of gas.

Kingston-on-Thames T.C.—The action of the Lighting Committee in accepting a tender to carry out the foundation work in connection with the extension of plant at the electricity works at actual cost, plus 10 per cent, was challenged by Alderman Woolnough, and was admitted to be an undesirable arrangement, but it was explained that no firm could be found willing to tender for the work.

Lisburn U.D.C.—The result of last year's working of the gas undertaking shows a profit of £818, compared with a loss of £763 for the previous year.

Loughborough T.C.—It was reported that there was a nett profit for last year of £1,012 on the electricity undertaking, and a profit of £544 on the gas undertaking. In the previous year the deficiency on the gas undertaking was £1,728.

Lurgan U.D.C.—Owing to the great waste of water the council have decided, after due notice, to cut off the water supply from any house or any property where leakages were found, and where the owners had failed to carry out the necessary repairs to pipes and cisterns in the meantime.

Paul (Cornwall) U.D.C.—The council have approved a scheme prepared by Messrs. Douglass, Lewis & Douglass, engineers, for the Mousehole water supply. The proposal is for a small scheme which could be developed later on. With the present yield about 12 gallons per head of the population could be supplied on the dry-weather flow. Twice this quantity would be required for an adequate supply. The springs were not at an elevation to supply the whole of Mousehole, and the water would have to be raised to a service reservoir. To meet present needs partly it was proposed to fix six street standpipes. If the work was not unexpectedly delayed, they estimated the cost at £570.

Scarborough T.C.—As the result of negotiations between the corporation and the Scarborough Gas Company, the corporation will save about £1,100 per annum in public lighting. They have been in the habit of paying 17s. per lamp maintenance charges. Last year they paid on 1,647 lamps, and used only forty-two, the amount of gas consumed costing £39. The company in future will only charge maintenance on the basis of the number of lamps used.

Warrington T.C.—It was stated that the loss on the water undertaking for the past year was £2,840. During the last five years the cost of production had gradually increased, and now stood at about 28 per cent above pre-war figures.

MISCELLANEOUS.

Camberwell B.C.—The General Purposes Committee report that they have concluded the purchase of three horses at the prices of £145, £135, and £110 respectively. The committee report that they are unable to organise a system of collecting waste for the purpose of pig-feeding.

Tyrone C.C.—The committee appointed to consider applications by assistant surveyors for increased salaries unanimously recommend increases ranging from £10 to £75. The report has been referred back to the committee.

PERSONAL.

Mr. W. J. Hiscox, borough surveyor of Wilton, has tendered his resignation.

Mr. J. Ward, borough surveyor of Derby, has had his salary raised from £780 to £950 a year.

Mr. W. W. Baker, deputy surveyor and sanitary inspector to the Paul, Cornwall, Urban District Council, has resigned.

Mr. E. E. Finch, chief engineer to the corporation of the City of London, has, with the consent of the committee under which he works, joined His Majesty's Forces.

Mr. F. Douglas Barton, acting engineer and surveyor to the Cheadle and Gatley Urban District Council, has been appointed temporary assistant borough surveyor of Hammersmith.

Captain E. Y. Harrison, R.E., borough surveyor of Guildford, has received an accidental head wound in France, and is now in the Prince of Wales' Hospital for Officers, Marylebone.

Mr. Fred Wolstenholme, son of the former borough surveyor of Blackpool, and engineering assistant in the borough surveyor's department, has received a commission in the Royal Marine Engineers.

Sergeant Charles Snell, formerly a member of the surveyor's staff at Abersychan, has been presented with a gold watch in recognition of his having won the Military Medal while on active service with the Monmouthshire Regiment.

Mr. D. C. Fidler, surveyor to the Hayes Urban District Council, has been voted 50 guineas for extra services in connection with the extension of the sewage disposal works, subject to the approval of the Munitions Works Board.

Mr. C. Turton, surveyor to the East Grinstead Rural District Council, was nominated by the council for the office of local fuel overseer, but declined to accept it on the gound that the duties would take up much time which he would not be able to give.

Mr D. J. Williams, F.S.I., has been appointed by the Board of Trade and the Ministry of Reconstruction a member of the committee "to examine and report upon the water power resources of the United Kingdom and the extent to which they can be made available for industrial purposes."

Mr. H. Clegg, surveyor to the Felixstowe Urban District Council, having joined the Army, the council have appointed Mr. J. Oates, professional assistant in the surveyor's department, to be acting surveyor. A sub-committee has been appointed to consider the appointment of a temporary assistant to Mr. Oates.

Mr. W. Watkins, chief water inspector of Bedford, has been presented with a number of gifts upon the completion of fifty years' active service in the waterworks department—quite a notable event in the history of municipal undertakings. The articles, which were formally handed to Mr. Watkins by the borough engineer and surveyor, Mr. N. Greenshields, consisted of a silver-mounted walking stick. silver-mounted umbrella, a case of pipes, tobacco, &c.

The following increases of salary have been granted to officials of the Glasgow Corporation:—Mr. James Dalrymple, general manager of the tramways department, £1,300 to £1,500 a year; Mr. L. McKinnon, traffic superintendent, £700 to £750; Mr. J. Ferguson, chief engineer, £700 to £750; Mr. G. H. Macfarlane, assistant superintendent of the cleansing department, £325 to £375; Mr. W. Grafton, gas department manager's assistant, £400 to £420; Mr. T. F. Harrison, engineer's assistant, £430 to £455.

OBITUARY.

We regret to announce the death on Sunday last, at the age of seventy, of Mr. George Waller Willcocks, C.B., M.INST.C.E., formerly chief engineering inspector to the Local Government Board. Mr. Willcocks commenced his career as a railway engineer, and was engaged on many important works of construction both in this country and on the Continent. The Thames Conservancy employed him to investigate the condition of the river from Purfleet to the sea, and subsequently he went to South Africa to construct waterworks in Natal and at Kimberley. In 1887 he became chief hydraulic engineer for Ireland, a position which he held until 1890, when the hydraulic engineering department was closed.—The funeral took place yesterday (Thursday) afternoon at Putney Vale Cemetery, following a service at Roehampton Parish Church.

HOUSING NOW AND AFTER THE WAR.

PROBLEMS TO BE SOLVED.

Mr. Hayes Fisher, replying to a deputation from the Labour Housing Association, at the Local Government Board, said housing was, he believed, almost the first item in the programme of reconstruction. As to the granting of loans free of interest, which the deputation had urged, he had already put before the Treasury a plan for the lending of money below the rate at which they could borrow it, but the Treasury had replied, "No, we could not possibly do that." The question of acquiring land at a reasonable price was being considered by a committee, which would shortly report. If the present Acts of Parliament did not enable them to acquire land at reasonable prices, other methods would be necessary. Committees were inquiring into the question of obtaining material, and other difficulties, including the millions of bricks which must be provided. One of the greatest difficulties would be obtaining sufficient skilled labour.

Saddleworth Urban District Council have sanctioned a proposal for the erection of an additional 150 houses.

Norham and Islandshire Rural District Council propose to build fifty houses after the war, at an estimated cost of £430 per house.

Twickenham Urban District Council have confirmed the recommendation of the Town Planning Committee to build 300 houses up to £12 rateable value, and 200 houses up to £20 rateable value, and that the surveyor, Mr. F. W. Pearce, be instructed to proceed with the preparation of a scheme.

It was stated at the Public Health Committee of the Somerset County Council recently that in the county by January, 1920, 3,000 houses would be required to replace old dwellings, and 1,200 to provide for the men that would be employed on the 60,000 acres of new arable land, whilst 1,650 would be needed for the increased population in the different rural and urban districts, making a total of 5,850. Following January, 1920, the yearly number required would be approximately 1,050.

LOCAL GOVERNMENT BOARD INQUIRIES.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the informaton given under this head as complete and accurate as possible.*

INQUIRY HELD.

South Shields T.C. (June 24th. Mr. P. M. Crosthwaite).—£18,400 for the purchase of 185½ acres for housing and hospital purposes.—It has been calculated that it would be necessary to erect at least 700 new houses of not less than four rooms to satisfy the present requirements of the town, and as private enterprise in the building trade was at a standstill the corporation realised that it was their duty to provide these dwellings.

APPLICATIONS FOR LOANS.

Chelmsford T.C.—£2,350 for the purchase of Admiral's Park.

Ipswich T.C.—£43,000 for electrical-generating plant.

Nelson T.C.—£3,300 for installing an ammonia-recovery plant.

LOAN SANCTIONED.

Whitehaven T.C.—£2,000 for additional generating plant at the electricity works.

Change of Address.—Messrs. Jenkins Bros., Limited, makers of the Jenkins gasket tubing, have removed to larger and more convenient premises at 6 Great Queen-street, W.C. 2, which they have taken to meet the rapid expansion of their business.

WINDOW-CLEANING DANGERS.

It is notorious that a large number of lives are lost every year in the process of cleaning the outsides of windows, not only in buildings of many storeys but in private residences. With the object of providing a means of avoiding such accidents the Austin Patent Window Company, of Ilford, have placed on the market an invention the ingenuity and simplicity of which will at once be apparent from the accompanying illustration. The adoption of this contrivanee makes it possible for every window—either top or bottom—to be removed instantly for cleaning purposes and afterwards as quickly replaced. If desired, the window need not be entirely removed, but cleansed as shown. Among other advantages

attaching to the use of the system is the fact that it permits of a window being sent to the glazier, and owing to the absence of beads, there is no spoilt paint resulting from repairs. Moreover, windows constructed on this system are just as weather-proof and burglar-proof as those of the more familiar type. Another important feature is that the addition of this simple method results in the tightening up of loose windows and the removal of annoyance from rattling. Existing windows can be converted without touching the glass. The cost of the system is stated to be very small, varying with the grade of fittings ordered; the company's Grade 2 fittings would be approximately 3s. 6d. per set, and if required to fit existing windows there would be the slight additional cost of the carpenter's time in carrying out this very simple process—an hour's work.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

SANITARY INSPECTOR.—July 15th.—Geirionydd Rural District Council. £107 10s. per annum.—Mr. T. Hughes, clerk, Union Offices, Llanrwst.

SURVEYOR.—July 15th.—Yeovil Rural District Council.—Mr. Mervyn H. Rodber, clerk, The Chantry, Yeovil.

ASSISTANT IN BOROUGH ENGINEER'S DEPARTMENT.—July 15th.—Rotherham Town Council. £150 a year.—Mr. G. L. des Forges, town clerk, Town Hall, Rotherham.

INSPECTOR OF NUISANCES.—July 19th.—Howden Rural District Council. £140 a year.—Mr. H. Green, clerk, Howden, East Yorks.

GAS AND WATERWORKS ENGINEER.—July 20th.—Accrington District Gas and Water Boards. £500—£700 a year.—Mr. A. H. Aitken, clerk, St. James-street, Accrington.

HIGHWAYS FOREMAN.—July 20th.—Salisbury City Council. Three guineas per week, with 12s. per week war bonus.—Mr W. J. Goodwin, city engineer and surveyor, Municipal Offices, Salisbury.

TEMPORARY ARCHITECTURAL ASSISTANT AND SURVEYOR.—July 27th.—Swindon Town Council.—Mr. R. Hilton, town clerk, Town Hall, Swindon.

TEMPORARY ENGINE-DRIVER.—July 30th.—Stourport Urban District Council.—Mr. A. D. Capel Loft, clerk, Council Offices, Stourport.

TEMPORARY SURVEYOR AND INSPECTOR OF NUISANCES.—August 5th.—Yiewsley Urban District Council. £200 a year.—Mr. W. H. Lea, clerk, Council Offices, Yiewsley, Middlesex.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

WELLS.—July 15th.—For rebuilding a small bridge.—Mr. O. W. Berry, engineer and surveyor, Poor Law Offices, Wells.

SALFORD.—July 15th.—For the erection of a sub-station building at the generating station.—Borough Electrical Engineer, Electricity Works, Frederick-road, Salford.

LEICESTERSHIRE.—July 19th.—For extensions to the Mowsley sanatorium.—Mr. T. I. McCarthy, architect, County Council Chambers, Coalville.

Engineering: Iron and Steel.

WAKEFIELD.—July 18th.—For the construction of reinforced concrete gauge basins and a small mass concrete drain, and also for laying about 200 lin. yds. of 18-in. east-iron pipes.—Mr. C. C. Smith, waterworks engineer, Town Hall, Wakefield.

CHELTENHAM.—For the supply of tar-macadam and screening plant, new or second-hand.—Mr. J. S. Piekering, borough engineer, Municipal Offices, Cheltenham.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories, &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

Roads.

BRENTFORD.—July 13th.—Two hundred and ten yards of blue Guernsey or other approved granite.—Mr. J. W. Croxford, surveyor, Urban District Council, Clifton House, Boston-road, Brentford.

ELY.—July 15th.—For the supply of 407 tons of machine-broken Leicestershire granite.—Mr. G. M. Hall, clerk, Market-square, Ely, Cambs.

TOTTENHAM.—July 20th.—For repairs to tar and asphalt paving.—Major W. H. Prescott, R.E., engineer and surveyor, Town Hall, Tottenham, N. 15.

WOODBRIDGE.—July 23rd.—For the supply of 282 tons of broken granite, $1\frac{3}{4}$-in. gauge.—Mr. W. Brooke, Urban Council Offices, Woodbridge, Suffolk.

SHEERNESS.—July 24th.—Supply of 200 tons of broken stone.—The Surveyor and Chief Engineer, Council House, Sheerness.

Sanitary.

CHELMSFORD.—July 17th.—For the construction of a surface drain.—Mr. Percival T. Harrison, borough engineer, Municipal Offices, Chelmsford.

WOLVERHAMPTON.—July 18th.—For the supply of galvanised sanitary pans.—Manager, Team Department, Crown-street, Wolverhampton.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

JULY.

13.—Royal Sanitary Institute: Mr. W. H. Beswick on "Camp Drainage, &c." Swindon Town Hall. 11 a.m.

19-20.—Institution of Municipal and County Engineers: Meeting at Stretford.

20.—Association of Managers of Sewage Disposal Works: Annual summer meeting at West Bromwich.

27.—Royal Sanitary Institute: Sir Henry Tanner on "Housing, from the Point of View of Economy in Planning and Construction." Ipswich Town Hall, 11 a.m.

27.—Institution of Municipal and County Engineers: Meeting at Maidstone.

AUGUST.

19-20.—Institute of Cleansing Superintendents: Annual conference at Stockport.

APPOINTMENTS OPEN.

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CITY OF SALISBURY.

APPOINTMENT OF HIGHWAYS FOREMAN.

The Corporation invite applications from persons ineligible for Military Service for the position of Foreman in the Highways Department (including Market cleansing and collection of house refuse). Wages, three guineas per week with an addition of 12s. per week War Bonus.

Applications, stating age and experience, and when able to commence duties, accompanied by not more than three recent testimonials, must reach me not later than Saturday, the 20th July.

W. J. GOODWIN, ASSOC.M.INST.C.E.,
City Engineer and Surveyor.

Municipal Offices, Salisbury.
July 4, 1918. (3,822)

STOURPORT URBAN DISTRICT COUNCIL.

APPOINTMENT OF TEMPORARY ENGINE DRIVER.

The above Council invite applications for the appointment of Temporary Engine Driver at the Sewage Pumping Station. Applicants must be ineligible for service in H.M. Forces, and must have had practical experience in the working and management of gas engines, and pumping machinery, and be able to carry out small repairs.

A list of the duties may be obtained by forwarding a stamped addressed envelope to the Council's Surveyor, Surveyor's Office, Stourport.

Applications, stating age, wages required and experience, with copies of three recent testimonials, should be sent to the undersigned, so as to be received not later than July 30th, 1918.

A. D. CAPEL LOFT,
Clerk to the Council.

Stourport.
July 6, 1918. (3,821)

URBAN DISTRICT OF YIEWSLEY.

TEMPORARY SURVEYOR AND INSPECTOR OF NUISANCES.

Applications are invited for the position of Temporary Surveyor and Inspector of Nuisances under the above Council.

The Council has under consideration a Housing and Town-Planning Scheme, and the person appointed must be capable of preparing plans, &c., in connection with this scheme.

Applicants should state age, experience, qualifications, when able to commence duty, and whether ineligible for Military Service.

Salary, £200 per annum.

Applications, in Candidate's handwriting, endorsed "Surveyor and Inspector," and accompanied by copies of three recent testimonials, must reach this Office not later than August 5th, 1918.

(By Order)
W. H. LEA,
Clerk to the Council.

Council Offices,
Yiewsley, Middlesex.
July 8, 1918. (3,824)

BOROUGH OF SWINDON.

APPOINTMENT OF TEMPORARY ARCHITECTURAL ASSISTANT AND SURVEYOR.

THE CORPORATION OF SWINDON invite applications for the position of TEMPORARY ARCHITECTURAL ASSISTANT AND SURVEYOR in the Borough Surveyor's Department. Applicants to state salary required.

Preference will be given to applicants with knowledge of "Housing" and "Town-Planning" Schemes.

Applicants must be ineligible for Military Service.

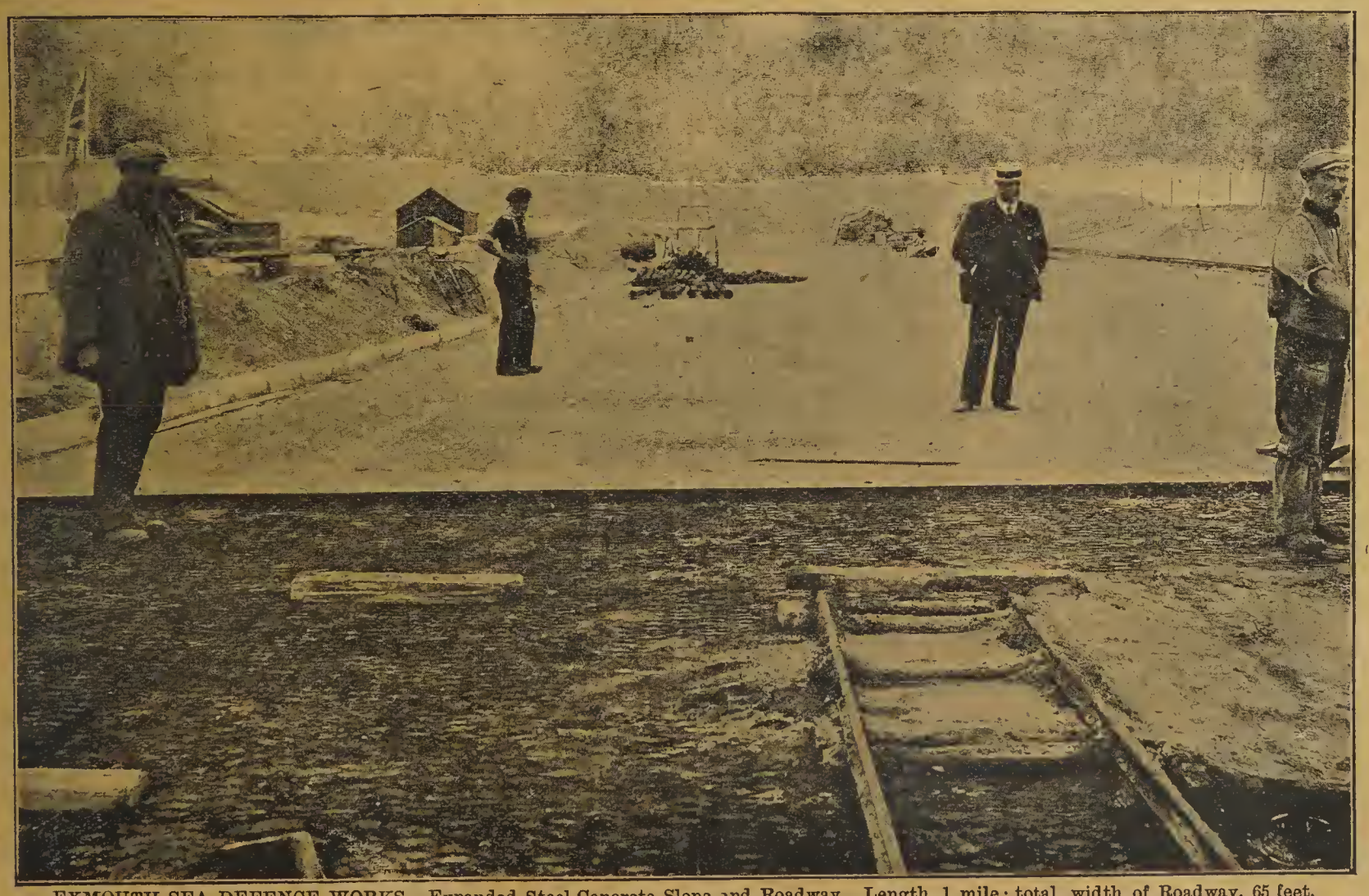
Applications, endorsed "Temporary Architectural Assistant and Surveyor," in applicant's own handwriting, giving particulars of age, qualifications, &c., present and previous appointments, and accompanied by copies of three recent testimonials, to be sent to the undersigned by SATURDAY, the 27th instant.

ROBT. HILTON,
Town Clerk.

Town Hall, Swindon.
July 8, 1918. (3,825)

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH
EXPANDED METAL.



EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet.
Mr. SAMUEL HUTTON, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED
(Patentees and Manufacturers of Expanded Metal).
Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.
Works: STRANTON WORKS, WEST HARTLEPOOL.

CITY OF OXFORD.

Wanted immediately, for the Sewage Pumping Station at Littlemore, 3 miles from Oxford, a Second Engineman to work under the Resident Engineer.

Wages, £2 2s., and a War Bonus of 5s. per week.

A house on the site is provided rent free, with coal, light, &c.

Sealed applications, endorsed "Pumping Station," stating age and previous experience, must reach the City Engineer, Town Hall, Oxford, on or before Thursday, the 18th July instant.

Candidates must be ineligible for Military Service.

Dated 3rd July, 1918. (3,818)

TENDERS WANTED.

METROPOLITAN BOROUGH OF WANDSWORTH.

The Wandsworth Borough Council is prepared to receive Tenders for the Construction of Surface Water Drain at Wandsworth Cemetery, Magdalen-road, Wandsworth.

The Specification and Drawings may be seen, and Forms of Tender and Contract obtained at the office of the Borough Engineer, M. P. Dodd, M.INST.C.E., 215 Balham High-road, S.W.

No Tender will be entertained unless it is made upon one of the Forms issued for the purpose, and delivered at the Council House, East Hill, Wandsworth, S.W., not later than 12 o'clock noon on Monday, the 22nd July.

D. A. NICHOLL,
Town Clerk.

Council House, Wandsworth, S.W.
July 2, 1918. (3,817)

APPOINTMENTS WANTED.

ROAD FOREMAN (44), discharged, ten years in last situation as general foreman in Urban District Council; excellent testimonials.—Box 1,655, Office of THE SURVEYOR, 24 Bride-lane, Fleet-street, E.C. 4. (3,823)

MISCELLANEOUS.

FOR HIRE, 10-ton and 12-ton Steam Road Rollers and Scarifiers, with or without drivers.—W. W. Buncombe, Engineer, Highbridge, Somerset. Telephone, 12 Highbridge.

JENKINS Bros VALVES

Fig. 106

MADE IN CANADA.

Fig. 142

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No glazing, only in glazier's shop.

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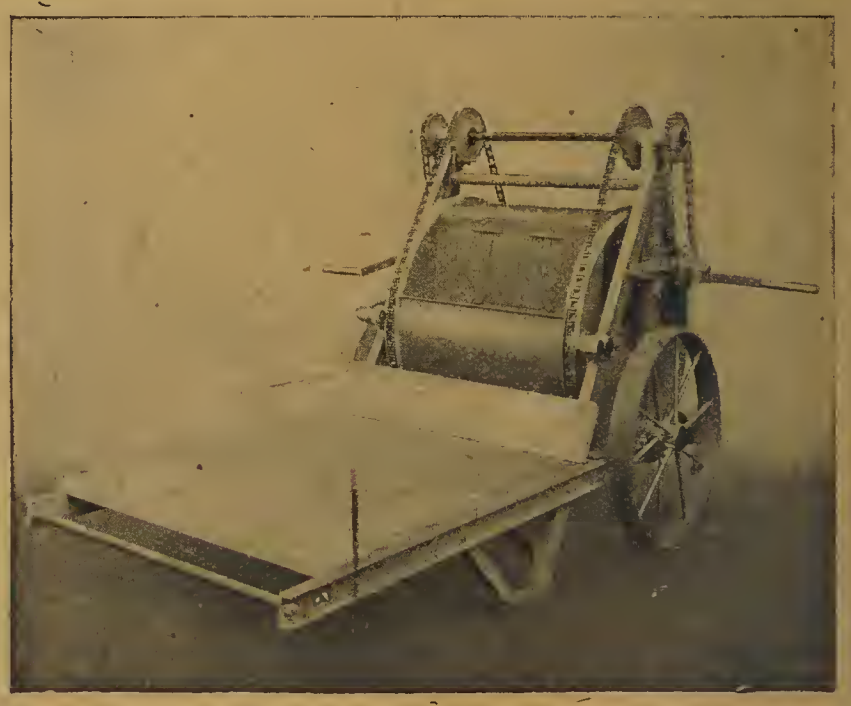

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The Surveyor

And Municipal and County Engineer.

Vol. LIV. JULY 19, 1918. No. 1,383.

Minutes of Proceedings.

Water Engineers and the Whitley Report.

An interesting feature of the recent annual summer meeting of the Institution of Water Engineers was the address delivered by Mr. Emil Davies (who represented the Industrial Reconstruction Council), in which he advocated the establishment of a "Whitley Council" for waterworks undertakings. We may perhaps remind our readers that the idea of a Joint Standing Industrial Council, or, more shortly, a "Whitley Council," is the outcome of a proposal by the Whitley Royal Commission that there should be established for each industry a national council, consisting of equal numbers of employers and employed. Mr. Davies recognised quite frankly that the proposal had only a limited application to what he described as "public utility undertakings," and intimated that the work of an industrial council in such industries would primarily lie in the direction of scientific developments and research, standardisation and education. This being so, it is hardly surprising that the proposal as set forth by Mr. Davies did not evoke much enthusiasm. His whole speech, indeed, was rather in the nature of an apology, and he appeared to recognise that, so far as water undertakings, and particularly those in municipal ownership, were concerned, the prime object of the "Whitley Council" was missing, and the council itself was therefore unnecessary. The prime object to which we refer is, of course, the adjustment of labour disputes, which in water undertakings are almost unknown. Not a little of the criticism to which Mr. Davies' remarks were subjected was accentuated by a suggestion that it was the intention of the Government, if necessary, to apply coercion for the purpose of forming these industrial councils. We sincerely hope that this will not be necessary, for the work of such a council compulsorily constituted would seem to be foredoomed to failure.

* * * *

Undesirable Housing in Sheffield.

We note that the Highway and Sewerage Committee of the Sheffield Town Council have incurred the anger of certain councillors because they made reference in their report to the city council to an instance of the human occupation of pigsties in Sheffield, with respect to which a paragraph has been going the rounds of the newspapers. One councillor wanted to know if there was no power to prevent such publication, and added that it was a singular thing that at the same time as they heard about the occupancy of the pigsties the city council were asked to sanction the demolition of seventeen more houses. But, after all, the Highway and Sewerage Committee might reply that their justification rested mainly on the question of fact, which, too, would apply in regard to the proposed demolition orders, for if the properties concerned were unfit for habitation it was obviously necessary that they should be dealt with. This contention will at the same time meet the objection of another councillor that for the past twenty years the committee had been concerned in a vigorous prosecution of owners of small houses. It is not suggested that this implies persecution, and the discharge of a necessary public duty by the committee is not inconsistent with an appreciation of the fact that in the past private enterprise has been responsible for the greater proportion of the dwelling houses built. It is only by a vigorous application of the sanitary laws that abuses can be dealt with, and it is merely obscuring the issue to talk about undesirable publicity and the (much-appreciated) services of private enterprise in so far as the provision of houses is concerned.

* * * *

Housing Bonds.

A novel suggestion for financing housing schemes on an economic basis by the issue of premiated housing bonds has been propounded by Mr. Malcolm Bennett, of Hornsey, and his plan as set forth in a recent issue of the Journal of the Institution of Municipal and County Engineers will arouse considerable interest. Financial considerations have always impeded the adoption of a vigorous housing policy, and apart from some radical alteration in the methods of the past—such as the promised Government assistance—finance would have been an insuperable difficulty in the way of after-war building. Mr. Bennett points out that even with the promised State assistance it will be impossible to finance housing schemes by charging economic rents, but that there will still be a deficiency to be met from the local rates. As an alternative he suggests the issue of premiated housing bonds bearing a low rate of interest, but carrying the right to participate in a half-yearly prize distribution scheme, about 6,000 cottages annually being given away in this manner. There would also be a number of "credit annuity" prizes, the winners of which would have their rent credited annually as part of the purchase price of their houses. The principal advantages claimed for this method of dealing with the problem are that the State would provide by *loan* a much smaller sum than it would otherwise provide as a *grant*, and that encouragement would be given to thrift and the individual ownership of cottages. It is perhaps improbable that the authorities will adopt Mr. Bennett's idea, particularly in view of the decision recently arrived at as regards State aid. Such a proposal, however, might well be considered by the Chancellor of the Exchequer if and when the general question of the issue of premium bonds again arises.

* * * *

Concrete Aggregates.

In view of the very extensive use of concrete which is bound to take place after the war in connection with "reconstruction" in its various aspects, the investigation into the nature and properties of aggregates available in the United Kingdom, which is being undertaken by the Concrete Institute under the auspices of the Department of Scientific and Industrial Research, is of the first importance. The investigation to which we refer is a development of general research work as regards concrete and concrete aggregates which was inaugurated some time ago and in connection with which the collaboration of many important universities and laboratories was invoked. It is satisfactory to record that those responsible for the new investigation which has been undertaken are seeking in the first place to secure information by means of a *questionnaire* which has been addressed to county engineers throughout the country. The organisations of the geological surveys of Great Britain and Ireland are also lending their aid, and the information thus gained should prove of the greatest possible value. The importance of the subject lies in the fact that the selection of a suitable aggregate for concrete concerns not only its cost, but also its strength. Indeed, it may be said with some degree of truth that the selection of a proper aggregate for any given purpose is hardly less important than the selection of a cement of the first quality. The results of the systematic investigations that are now being made on scientific lines should be of the very greatest value.

* * * *

The War-Spirit of the Road-Builders.

New York *Engineering News-Record* is publishing a series of articles with respect to the work of the road-builders at the American sector in France in which, apart from information as to constructive works, an interesting sidelight is thrown upon the *esprit de corps* of many experienced roadmen who are helping to defeat the Hun. Many of the rank and file, we read, are experienced construction men, road builders or engineers with degrees from the leading technical schools, who expected to be assigned, on their arrival in France, to jobs of a supervisory capacity—as bosses of gangs on road construction or maintenance. Up to the present time it has not been possible for all these expecta-

tions to be fufilled, and men with qualifications which would ordinarily place them in positions carrying varying degrees of authority are found swinging pick and shovel or breaking rock. "When we have at our disposal," the writer proceeds cheerfully, "a larger supply of labour battalions and have captured more prisoners, it is probable that there will be a change in the status of many of our road builders who are now doing ordinary day-labour jobs. Nevertheless, the men are buckling down to their task and showing an excellent spirit." Though this is only what we should expect from the man whose ideas have been developed by a liberal education and intensified by technical training, it is worth putting on record as typical of the thoroughness with which our American cousins are bending to the accomplishment of their stupendous war task.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

THE INSTITUTION OF MUNICIPAL ENGINEERS AND WAR BONUSES.

To the Editor of The Surveyor.

Sir,—As you kindly reported in your columns some short time ago, a circular letter was sent out by the Institution of Municipal Engineers on the question of war bonuses. A copy was sent to every local authority, no distinction being made as regards authorities served by members of this institution or by members of any other body.

The result of the circular letter has been distinctly satisfactory, and I have been deluged with letters of thanks from all parts of the country. There is, of course, no means of knowing precisely in how many instances bonuses have been granted as a direct outcome of the letter, but sufficient testimony has reached me to prove that their number is not inconsiderable. In one case practically the whole of the official staff benefited, the engineer, the highway surveyor, the sanitary inspector, and the assistant clerk all having their bonus raised to the Treasury scale. In another case the surveyor, immediately upon the reading of the letter, was granted an increase in his salary (not a war bonus) of £30. The letters setting forth these facts, together with many more to the same effect, lie open here to your editorial inspection.

It has been thought well to seek publicity for the above, as it would seem to indicate that local authorities are open to give consideration to any reasonable propositions made in the interests of their officers, and that what they often need is some authoritative guidance (such as the Treasury scale in the matter of war bonuses) to assist them in their deliberations.—Yours, &c.,

B. Wyand,
Secretary.

INSTITUTION OF MUNICIPAL ENGINEERS.

MEETING AT WOLVERTON.

The members of the South-Eastern District of the Institution of Municipal Engineers spent the day at Wolverton on Saturday, the 6th inst.

Wolverton, the carriage-building centre for the London and North-Western Railway, is a compact little town built in blocks on the American principle. The streets are tarred macadam, and each has its backway also tarred. It is probably one of the cleanest and best-kept towns of its size—it has a population of 7,000—in the country. The acting surveyor (Mr. J. B. Fairchild) is surveyor to a neighbouring rural district (Potterspury, Northants), and took over the additional duties when Wolverton's surveyor (Mr. A. Abbott) volunteered for road work in France a year ago. The following gentlemen assembled at the railway station in the morning:—Messrs. Reginald Brown, M.B.E., M.INST.C.E. (Southall-Norwood), president-elect, A. Walker (Headington), J. N. Singleton (Scarborough), G. Belson Chilvers (Buckingham borough), W. Chas. Robson (Brackley), Leonard Foster (Ampthill), O. L. Browne (Bedford Borough), F. R. Chapman (Bedford Rural), J. B. Fairchild (Potterspury), H. Cripps (Winslow), H. R. Locke (Hemel Hempstead), F. Reynolds (Buckingham R.D.), and B. Wyand (secretary of the Institution, London).

By permission of the carriage works superintendent (Mr. A. R. Trevithick), the members were taken over the works, which at their normal capacity employ some 5,000 hands, but have been considerably reduced of late through war exigencies. The streets were inspected *en route* to the place of meeting, the Craufurd Arms Hotel. Mr. Reginald Brown was appointed chairman of the gathering *pro tem.*

ELECTION OF DISTRICT OFFICERS.

The Chairman moved that Mr. G. B. Chilvers be chairman of the district for the ensuing year.

Mr. Singleton seconded, and it was carried.

Having taken the chair, Mr. Chilvers assured the members of his interest in the work. As they knew, he had been secretary of the Eastern and North-Eastern Districts, a position he had to vacate on being appointed to Buckingham. He intended to do his best for the institution and try and get as many members as possible. He alluded to the difficulty of arranging meetings owing to the inconvenience of railway travel and the expense, which was a considerable item (with the 50 per cent) on their meagre salaries.

In moving the re-election of the hon. sec., Mr. Harold Pickering, of Dunstable, the Chairman said Mr. Pickering had sent a letter explaining that, owing to the prevailing epidemic of influenza and the rush of work entailed by the issue of rationing books, he was unable to attend. A letter was also read from Mr. E. C. Pearcey, correcting an item on the programme, which stated that the steam tram from Wolverton to Stony Stratford was the only one left in the country, and pointed out that there was another one at Sittingbourne, one of the first—if not the first—laid down in the country. Mr. Pickering was unanimously re-elected.

With respect to the nomination of a district vice-president, Mr. Brown counselled that the matter should be left open, unless they knew of a man who had done really good work for the institution. His suggestion was accepted.

With regard to the district programme for 1918-19, Mr. Chilvers said he wanted to fix up one or two meetings, and threw out a suggestion for an invitation. They were out not altogether for pleasure, but to learn something for the districts they represented. They did not learn anything from the large towns, but from the smaller ones.

Eventually it was left with the secretary and Mr. Chilvers to arrange meetings.

LUNCHEON.

At luncheon Mr. Chilvers proposed "The Institution of Municipal Engineers," to which Mr. Brown, who presided, appropriately replied. He referred to the fact that the institution was increasing in membership (some eighty members having been added in two months), which augured well for its future, and, touching on the difficulties of surveyors in rural districts, remarked that they were often up against farmers who were quite satisfied with what did for their grandfathers and did not want any alteration. They (the surveyors) could stick to their guns, start on a straight line, and bear in mind three things—a clear head at all times; what was equally important, a clean hand; and what was still more important, a thick skin. (Laughter.) Mr. Brown concluded with some excellent advice on the taking up of duties under the Coal Control Committees.

Afterwards the members inspected the sewage disposal works at Wolverton and Stony Stratford, time not allowing of the visit to the water-pumping station at the latter place.

COUNCIL MEETING.

At a council meeting of the Institution of Municipal Engineers held in London on July 4th a letter from the Local Government Board stating that, having regard to the reply given by the President to a question put to him in the House of Commons in the name of the institution, the board "see no advantage in troubling a deputation from the institution to attend," was considered, and it was decided to take certain further steps in the matter.

It was decided, on the motion of Mr. F. A. Pratley, "That it being desirable, in the opinion of this institution, that municipal engineers should be represented by one strong body, and with this object in view the Institution of Municipal and County Engineers be asked to appoint three of the members of their council to meet three members of the council of this institution to discuss the matter, and to report later to their respective councils."

The secretary read certain letters which had been received from surveyors (not necessarily members of the institution) and clerks in which approval was expressed of the action of the institution in taking up the question of war bonuses. It was noted with satisfaction that in several instances a bonus or increased salary was granted immediately upon the consideration by the local authority of the institution's letter. As an example, a rural district in Yorkshire raised to the Treasury scale the war bonus of their engineer, highway surveyor, sanitary inspector, and assistant clerk. In another rural district the surveyor was given a £30 increase of salary.

FORTHCOMING MEETINGS.

A meeting of the Eastern and North-Eastern Districts of the Institution of Municipal Engineers will be held at Spalding on Saturday, the 27th inst. Members will meet at the Corn Exchange at noon, and the business will include the election of chairman, vice-chairman, hon. district secretary, and nomination of district vice-president. During the afternoon inspections of the sewage works and the urban council's housing scheme will be made.

The annual meetings of the Western, South-Western, and Northern Districts will take place on the same day at Worcester, Exeter, and Newcastle respectively.

Some Random Notes on Roads, Traffic and Improvements.*

By A. DRYLAND, M.INST.C.E., County Surveyor, Surrey.

The subject of roads has been so much written upon and talked about of recent years that it is difficult to find any new aspect to present in the form of a paper, but it may be useful to direct attention to a few special points which occur to one in the course of experience, and they may perhaps form the subject of thought and discussion amongst those who are specially interested in the road question in all its aspects. The author has chosen the title of his paper to allow latitude to roam over a wide field.

TRAFFIC AND ITS EFFECTS.

Can one prognosticate the developments of the near future? One *must* try and form some idea, so as to be able to lay plans for meeting them, as undoubtedly the war will in this, as in most other things, bring unaccustomed conditions. The author thinks it may be taken as certain that heavy haulage of all types will develop rapidly. The shortage of horses which has been experienced has turned everybody's thoughts to substituting mechanical haulage, and this has been done to a great extent even during the war. What with the thousands of lorries returning from Army service which will come largely into use in aiding the "arts of peace" instead of war, the waiting lists all manufacturers of heavy vehicles have, and the immense enlargement of output of this type of vehicle developed during the war, the number of the heavy haulage vehicles to be provided for will go up by leaps and bounds. The railways will be in such a state of deterioration and have such a shortage of rolling stock that it will take some years to restore them to their pre-war condition, and this will enhance the demand for road traffic.

It certainly looks as if municipal engineers are up against a tough proposition. The deteriorated road crusts, which will take some years to restore even to their former sound condition, will be tried as they have never been before, and by the most damaging factor among road destroying vehicles. There is no doubt that heavy motor vehicles are the most damaging of any on our roads to-day. The effect of the motor 'bus has demonstrated to us what a trying form of traffic it is, and most of the additional traffic will be of a heavier type than these, and will probably attain greater average speeds because of the lesser number of stoppages. It is a common experience on country roads to find vehicles of over 5 tons weight unladen, and with perhaps a load of another 5 tons, travelling at speeds exceeding 20 miles per hour, and the effect of this speed and weight combined needs no emphasising in the minds of so observant a class as the members of this institution. It is a natural consequence that the extreme effect of this traffic is more felt on the open road than in the more congested urban areas, where the speed is kept within moderate limits. How is this development to be met? First we may safely assume that on any road subjected to a considerable proportion of this class of traffic waterbound material is out of the question. In these days when so much is conveyed by initial letters we might well impress in our minds a new formula—viz., W.B.M.G.! (Water Bound Must Go)! It does not give a surface with sufficient tenacity to resist the tendency to wave formation of the heavy self-propelled vehicle, and there will be insufficient of the horse-drawn and generally larger wheeled traffic to counteract its corrugating effect. This leads one to refer to this bugbear of Corrugation, and it may well be spelt with a big C as it is going to be our principal trouble. A very cursory examination of every kind of surface, ranging from the steel rail of the railway or tramway down to the most primitive form of road surface will disclose its baneful presence. Weight multiplied by speed is the law governing its formation and exaggeration. How are the best known forms of construction going to withstand it? The author has been much struck during the past year or two by the wave formation on what he considers the best form of tar-macadam—viz., slag. This corrugation is far more apparent on the new work than on that which has been down several years, and clearly indicates that the wave formation is due to plasticity, which is undoubtedly less on the well-settled and consolidated coatings. It is feared that in the future it will not be possible to get the even surfaces of the past. If this is right, and it is necessary to anticipate the occurrence as a natural corollary of these waves in all kinds of new surfaces of a semiplastic nature, what is likely to be the position of the speedier and lighter vehicle which demands an even surface for smooth and comfortable travel? Can one give them such a surface as they require and yet sustain the heavy vehicular traffic? I doubt it; but it is up to the members of this institution to solve the problem. Can help be expected in the direction of a modification of either weights or speed? Apparently not, as both factors have such a strong bearing on haulage economy, and industry is, and ought to be, "top dog," and the surveyors will be in the position of the "nether millstone." But there are economical limits, as the railway engineer and the steamship proprietor have found, to the economy to be made by the increase of weight and speed; and in the author's view the legal limits already permitted are in the case of heavy motor vehicles up to, or beyond, the maximum which will be found economical when vehicle and track costs are both taken into consideration; and it must be borne in mind that the legal limits are much more honoured in the breach than in the observance.

It has been observed that among the military lorries there is a large number of the four-wheel drive type, and the author would be glad if any member can throw any light upon their relative road damaging capacities as compared with the back-wheel drive. They ought to relieve the strain set up by propulsion by dividing it, and he would like to have some definite guidance of the results of observation if any members have had sufficient opportunity of forming a judgment.

Standardisation, which is a good servant but may prove a bad master, has not been kind to us as track purveyors. There can be no doubt that the regularity in the diameter of wheels is a strong factor in stereotyping corrugations. If there had been a greater variety in wheel diameter, and particularly a good proportion of those of a larger diameter, our trouble past and future would be less. It may be that the exigencies of the roughness of the track may yet drive the motor industry to adopt a larger wheel diameter, as smoothness of travel is a prime factor in economical maintenance of vehicles.

To turn to another feature of the growth of heavy haulage, the author is impressed with the tendency of the heavy vehicle to keep well to the side of the road, a tendency to be encouraged, but bringing with it an additional strain on what is, in the country, almost invariably the weaker part of the road. The slight tilt of the vehicle, from the necessity of the road camber, throws further weight on the extremities of the road width, and the strain where there is least counteracting support. It will be necessary to strengthen the haunches by kerbing, which means a large expenditure hitherto deemed unnecessary for country roads.

ROAD TRENCHINGS.

This is another bugbear of the author's. In the old days of universal waterbound macadam trenches were an abominable nuisance and source of weakness, but the cost of reparation was not very serious. With all the more permanent forms of surface now in vogue, trenches are not only a nuisance but a constant source of expense. Who amongst municipal engineers has not had experience of a new road surface spoiled and its life curtailed by trenchings for gas, water, electricity, sewers, cables, &c.? With the heavy vehicles of to-day the carriageway is no place for mains of any kind. If they must go there let the trenches be filled up solid with concrete (it may be of a poor kind), but do let there be a solid bed on which to resurface. Weak spots in our foundations cannot be afforded. As one who has been badly "wounded and scarred in spirit" by road trenchings, the author appeals to all his fellow members to join with him in putting forth efforts to get protection more suited to the present day than is afforded by the Gas and Water Clauses Act of 1847, sufficient perhaps in their day and generation but utterly inadequate for the present needs. Let them try and get new clauses, not as is necessary to-day in individual cases by fighting Bills in Parliament, but such as will be of universal application to all road openings by whomsoever made. What we really need is a definite statutory ownership of roads and the subsoil thereof by the public road authority; but if one could get real and effective power to restore solidity in whatsoever manner the circumstances of the case might require it would be one of the largest steps in the way of the permanent betterment of the roads that has been made for generations.

There is an interesting point in connection with trenches in roads that calls attention—viz., Why is it that the effects of subsidence are so much more marked on waterproof surfaces? Is it because the exclusion of surface moisture and subsequent absorption by the surrounding ground reduces the moisture in the filling of the excavation and causes contraction? The author is led to this inquiry by observing that old trenches of several years' standing, which have not been noticeable on waterbound roads, have subsided sufficiently to crack the surface at the edges of the trench within a year or two of being covered with a waterproof surface.

LIFE OF ROAD COATINGS.

It is very interesting to keep a record, as memory is a very

* Paper presented at the annual meeting of the Institution of Municipal and County Engineers.

untrustworthy guide. For the last nine years records have been kept on 25-in. scale maps of all the road coatings laid on all the main roads in Surrey. The author was able to get reliable information as to some few special lengths coated previous to his coming to Surrey, so in some cases these records go back to 1905. When he has occasionally a few minutes to spare he finds it very interesting and instructive to go to the drawer and peruse these records. They disclose among many other things, both favourable and unfavourable, the fact that slag tar-macadam coatings laid in 1905 are in existence to-day, and other lengths from 1907, 8, 9, 10 and 11. Some have had considerable surface repairs besides frequent tar-dressings; some have gone through these periods with no repairs worth noting. The author wishes he could think that similar coatings laid in 1918 and subsequently could look forward to such a period of longevity. Anyway, he will endeavour to keep his records going, and some day, when more time is available, may be able to give in the form of a paper some interesting life histories of quite a number of different forms of road surface, including a good variety of variations in the use of asphaltic surfacings. In the meantime, if any member feels interested and will pay him a visit he will with pleasure show him the records.

ROAD WIDENINGS AND IMPROVEMENTS.

When "reconstruction" is in the air, and there is a condition of fluidity of opinion as compared with the former state of somnolence, cannot one make a "push" and get a material advance in the direction of speedy and cheap powers of acquisition of land for public improvements? Just now there is a tendency to view what has hitherto been the "sacred right" of property (particularly in land) in a somewhat different light, and to consider there are certain obligations in its ownership as well as rights, and, in particular, that the public has an interest in the way it is used. This spirit, which is undoubtedly abroad, may be of use if engineers can "strike while the iron is hot," and free themselves from some of the shackles which have rendered widenings and improvements to roads so slow and expensive in the past, mainly due to the price which has to be paid for land, notwithstanding the fact that its surrender may, and generally does, add to the value of that which is left, owing to the public improvement. The author does not for a moment advocate public improvements at the cost of the private owner; on the contrary, he would not rob him of one penny of that which is his due; but let him have only his due, and do not let him blackmail the community because he happens to be the possessor of land adjoining a public highway. Further, do not let the acquisition and transfer of land required for public improvements be made the occasion for piling up legal and other costs to an extent often far in excess of the value of the land. The owner of land which is acquired for public improvements should be entitled to compensation to the extent only of the actual loss of value he sustains by the operation of surrender or severance, after taking into account any added value that may accrue to the rest of the property by reason of the improvement. To-day that view would find pretty general acceptance. The main difficulty is the ascertainment of what that loss of value is in a just, speedy, complete and inexpensive manner. Surely this can be done without the paraphernalia of first of all acquirement of compulsory powers, then solicitors being engaged, an arbitrator, with counsel and expert witnesses on both sides, The general result, after all this tedious and expensive process, is that the award lies somewhere in the region of striking an average of the exaggerated values in the upward and downward direction put forward by so-called "expert" witnesses. There is now, the author believes, an official valuation of all the land in the country, and, imperfect as it may be, he suggests it is not probably more so than the values arrived at by the arbitration method. Why should not all values affected by the acquirement of property for local public purposes be valued by the Government valuers' department, who, as they would be quite disinterested, would hold the scales fairly and do justice between the parties? An alternative would be to set up a panel of valuers, specially selected for their qualifications, and let it be their duty to ascertain and decide the compensation.

There should be general statutory powers enabling public authorities to purchase such land as they consider necessary for the *bonâ-fide* purpose of a road widening or for a new road. The subsequent proceedings, the author suggests, might be confined to a formal notice to the owner of the resolution of the public authority approving of the proposed improvement, accompanied with plans and particulars of the same, with a notification that after, say, a period of one month the question of compensation would be referred to the official valuer, to whom both parties might have power to send a statement of their views as to what the amount of the compensation should be, and any information they thought necessary in support of their views. The valuer would no doubt give full consideration to any facts so submitted, and would proceed to inspect and value the property and make his award, which should be final and binding on both parties. In many cases a subsequent conveyance would be quite unnecessary, as the land would be thrown into the highway, and thus dedicated to the public. If this institution could put forward in the right quarter some definite and reasonable suggestions for effecting the public purpose in view the author feels it might possibly lead to substantial improvement of present conditions. The author believes a Government Committee has already had something of the kind under consideration and made a report. From what he could gather from the scanty reports he had seen of its conclusions, it did not go far enough in removing the incubus of costs, and he suggests now is the time to initiate a "push" to get more desirable powers.

BUILDING LINES.

There should undoubtedly be power vested in some road authority to "define" a building line not only on new roads, but on those now existing, for the purpose of securing that road improvements shall not be further blocked by new buildings, and with a view of providing for adequate future width on roads which are likely to become main traffic arteries. The author has advocated elsewhere that the county council of a county or borough should be the "authority" for this purpose, working of course in consultation with the local road authority. His object in suggesting the county council is to secure that a somewhat wider view may be taken than it is always possible to get from the smaller local authorities, and to secure that the width of a road may be defined as a continuous route so there may not be varying widths under each intervening authority of an important present of potential traffic artery.

As a safeguard to the owner of property the author would suggest that the owner should be entitled to compensation if the value of his property is adversely affected by the laying down of a building line, and that such compensation should be assessed in the same way as for the acquirement of property hereinbefore suggested.

NOTES ON CLEANSING WORK.

By M. I. C. S.

Finsbury's Motor Sweeper.

Mr. Thomas B. Crookes, the cleansing superintendent of the metropolitan borough of Finsbury, recently submitted to his committee a full and detailed report on the work of the motor sweeper which began work in that part of London in June of last year. The machine was the first "Lacre" motor sweeper to be employed in the Metropolis, and although the committee were anxious to obtain a "Laffly," I do not think they now regret their purchase. Certainly there is much still to be said in favour of the French make, but at the outbreak of war we had had little experience of the "Lacre," and the Lacre Motor Car Company had consequently not had the opportunity of making improvements in their machines, which can only come from practical experience. But since the French Government put an embargo on the export of the "Laffly" the Lacre Motor Car Company have had their chance, and by all accounts the "Lacre" machine is making the most of it. The firm, I believe, are inundated with orders which they cannot supply on account of Government work having to take priority. If the "Lacre" people will only learn by the experience of to-day, they should have no difficulty in retaining the market when the war is over.

* * * *

The report to which I have referred covers a period of six months, and shows that the motor sweeper has saved the Finsbury Corporation £120, if the comparison is made with war conditions. Really the saving must be put at £248. It is clearly set forth that, on account of shortage of men and horses, a smaller number of horse-brooms have been engaged; but the motor sweeper is now doing as much work as was ever done by four brooms in normal times, and that is why Mr. Crookes claims the additional saving. In fact, he says it would not have been difficult to have shown even a better balance-sheet in favour of the motor. In saying that he is simply stating what has been stated and restated time and time again. There are not many left who need convincing that mechanical traction is the only thing nowadays for public cleansing work, and particularly on street sweeping. In any operations where there is a good long run and with few stops, horses have had their day, and of all municipal work which I know where mechanical traction can be employed street sweeping is the most favourable.

* * * *

Street Watering.

Writing about the streets reminds me that comparatively few of our authorities have developed mechanical traction for street watering, and here again there is fine scope for its employment. The price of those machines that are on the market is high, but, in spite of the excessive price, I think they would be a paying proposition. If some of our go-ahead motor firms can turn out a machine at about £500, there is a market, and a good one too. I think it can and will be done on standardisation lines.

MUNICIPAL COTTAGES.

By Albert C. Freeman,
Author of "Planning of Fever Hospitals and Disinfecting Stations."

We are informed by Mr. Hayes Fisher, President of the Local Government Board, that the Government is now propounding a policy by which local authorities would enter into partnership with the State in the building of houses for the working classes. The State would have to bear the main financial burden of the scheme and the local authorities take a small portion of the

Fig. 1.

burden and the risk. I have perused with no little interest the numerous reports of Mr. Hayes Fisher and others interested in the question of the housing of the working classes, and have been astonished at the small amount of thought hitherto given to the question as to how the buildings are to be erected. It is doubtful whether the President of the Local Government Board fully realises the shortage of materials generally used in the construction of buildings. The principal points which have occupied the minds of those interested in the housing question have been the number of houses per acre, the system of main and arterial roads, the fixing of building lines, open spaces, and the general planning of the houses.

The all-important question of how we are to erect the houses appears to have received little or no consideration by those in authority. With the limited supply of raw materials, the control over imported timber, which so largely enters into the construction of the ordinary dwelling, and the inevitable shortage of bricks, tiles, slates, and foundry goods, we shall be faced with a desolation worse than the war. The first step required of the Local Government Board is an amendment of the by-laws to meet the present-day needs.

Having given much thought to the many points connected with the housing of the working classes after the war, I have arrived at the conclusion that the first and all-important question is that of materials and forms of construction. In view of the anticipated shortage of all materials in general use in the construction of such buildings in the past, it is necessary to find new methods and new forms of construction to meet the immediate requirements. Little or no imported timber will be available for this class of building for a considerable period after the war. That which reaches this country will be required for more important works than that of dwellings for the working classes. Then, the output of bricks and tiles will be somewhat restricted, while the quarrying of slates will be limited owing to the shortage of labour.

As the primitive man had to turn to new materials and new forms of construction, so shall we of to-day. It therefore becomes a question of how to erect buildings with the minimum amount of the old standardised materials. To meet this requirement I have designed a structure principally of concrete, in an entirely new form. I here give an illustration of a cottage with accommodation of a kitchen, sitting-room, pantry, bathroom, and two bedrooms, constructed *with practically no timbering*. In the roof there is no timber; there are no rain-water gullies or rain-water pipes. No slates or tiles are provided for the roof covering, and the drainage is reduced to the minimum. The main structure is constructed of concrete—in an entirely new form—and the whole of the exterior is finished with rough-cast cement plastering. The interior walls and ceilings are plastered, and the various apartments planned and fitted to meet the requirements of an up-to-date, labour-saving dwelling.

The question of cost, which must necessarily be considered, has been taken seriously into account, and it is claimed that with this form of construction a building can be erected more than 40 per cent cheaper as compared with any other form of construction. Local authorities, I am sure, are open to new suggestions, and will view with open minds new ideas. Therefore I place before them a scheme of new construction which is both practical and economical.

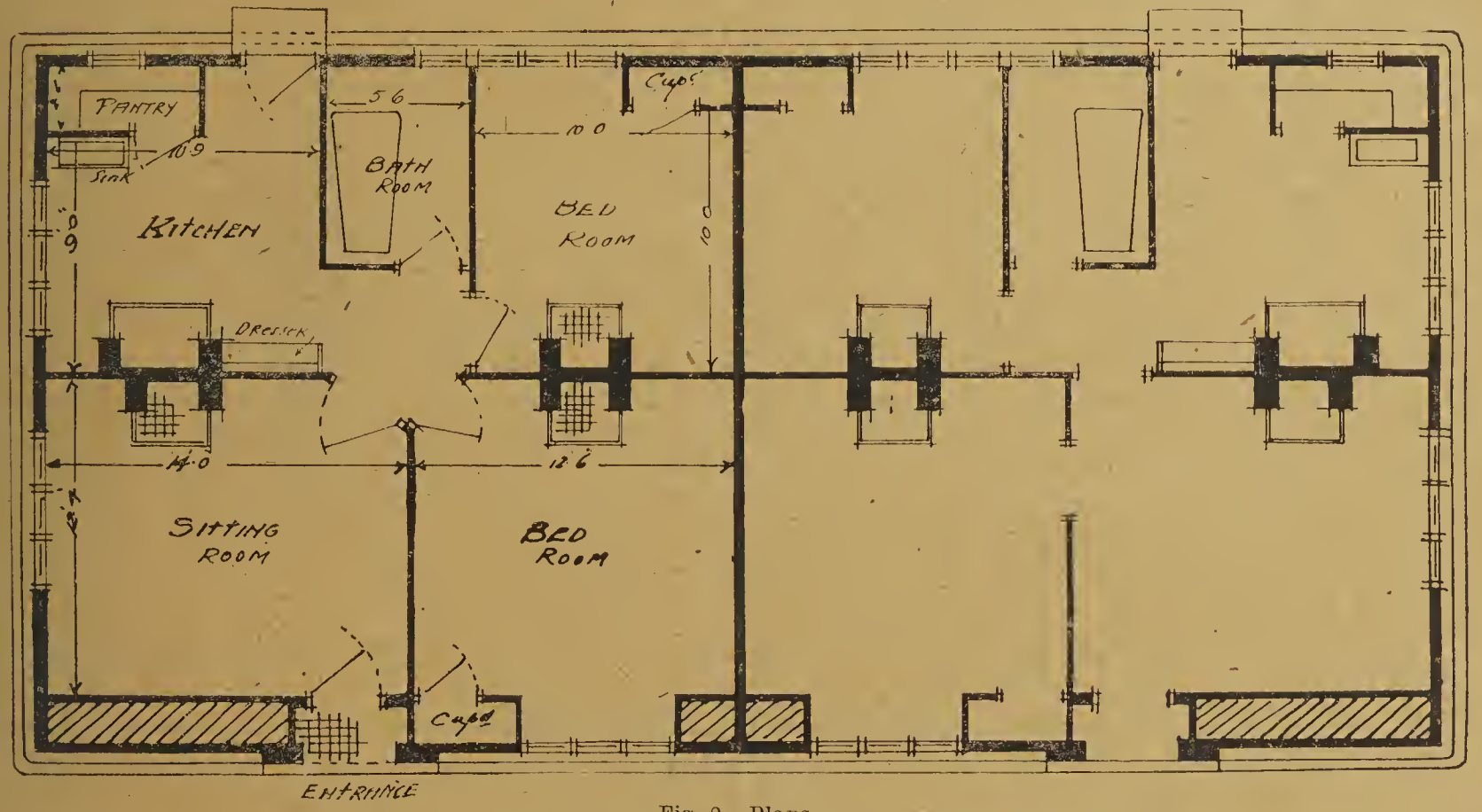


Fig. 2.—Plans.

New Type Municipal Cottages ("Freeman's" System).

Repair of High-pressure Water Main.—Writing in *Engineering News-Record*, Mr. H. A. Rands describes how a break in a 15½-in. water pipe line was recently repaired by using a 6-in. by-pass over a stream under the bed of which the failure occurred. The water pressure was here 133 lb. per square inch, and the unbalanced pressure was 10·5 tons on the end of the wooden ring used to "adapt" the by-pass to the main pipe. The carrying capacity of the conduit was reduced from 3,200,000 gallons to 2,500,000 gallons per twenty-four hours by the use of the by-pass. The break occurred at a 30° L-joint at the bottom of one bank. The wooden rings or plugs were held tight by clamps and struts transmitting pressure to the sleeve and so to the pipe. The latter acted as a column, and, to prevent buckling, it was carried by several vertical supports.

CONCRETE ROADS IN NEW ZEALAND.

METHODS OF CONSTRUCTION IN AUCKLAND CITY.

In 1910 the city engineer of Auckland, New Zealand, Mr. W. E. Bush, M.INST.C.E., recommended to the city council the use of concrete as a paving material for streets, but it was not till the latter part of 1915 that the first street to be paved with concrete was authorised, the thoroughfare selected being Little Queen-street.

Little Queen-street lies between Quay and Custom Streets, parallel to Queen-street, and carries very heavy traffic, the effect of the traffic being accentuated by the fact that the whole street forms the goods approach to the warehouses abutting on it, and therefore there is a lot of turning and twisting done in backing into the warehouses.

The concrete pavement was laid on the ordinary road bed after the latter had been scarified and a portion of the metal and some of the foundation boulders which protruded removed. The thickness was 8 in., and consisted of 6 in. of 7 to 1 cement concrete on which was placed 2 in. of 3 to 1 concrete as a surface course, this surfacing course being placed on before the lower one was set, practically producing a monolithic pavement. The surface was carefully screeded and worked up with steel trowels, after which, when hard enough, it was lightly broomed. The work was covered with bags which were kept in a damp condition for about fourteen days, and no traffic was allowed on the pavement until three weeks after completion.

The foundation consisted of 1 part Portland cement, 5 parts beach shingle including sand, and 2 parts 2 in. to 2½ in. metal, and the top surface of 1 part Portland cement, 2¼ parts of beach shingle and sand and ¾th parts of ⅜-in metal chips.

The longitudinal gradient was about 1 in 33, and the transverse grading varies from 1 in 36 to 1 in 22, the latter being necessary in order to grade with an intersecting street. Concrete was placed in 14-ft. transverse bays across the whole width of the street—46 ft.—and each joint was coated with soft soap. No other expansion or contraction joints were provided.

Little Queen-street was allowed to carry the traffic for nine months with its cement concrete surface, at the end of which time it showed very little, if any, sign of wear, and then it was coated with a surface dressing of Union asphalt and screened beach shingle at a cost of about 5d. per sq. yd. This coating has stood extremely well, and necessary small renewals are easily and quickly made. It has the effect of minimising the noise, doing away with the glare, and of protecting the surface by practically taking the wear. It also gives a better foothold for horses, but adds slightly to the tractive resistance.

The next street authorised to be done with concrete was Durham-street West, a street running off Queen-street, completed in October, 1916, in which case the concrete was made 7 in. thick of 5 of shingle to 1 of cement put down in one coat with the surface finished off as in the case of Little Queen-street.

No cracks are observable therein, and the effect of wear is hardly apparent, the marks of the broom being still noticeable on most of the surface.

Park-road at the Eastern end of Grafton Bridge was put down in concrete of a similar thickness and strength to that in Durham-street West, and completed in July, 1917. Owing to the work having been done in winter, the time given for setting did not prove as long as was desirable, and the surface shows signs of wear in places. This has since been coated with Union asphalt.

A length of accommodation road behind the new city markets has been laid down in cement concrete similar to that in Durham-street West, and Quay-street extension, a street carrying possibly as heavy traffic as any in Auckland city, has also been paved in cement concrete. Intersecting it are three sets of railway sidings and also the continuation of the rails laid in Quay-street, and from it access is obtained to the King's Wharf and railway yards, the city power station and other large industrial premises.

COSTS.

In the latter case the aggregate was, and for future work will be, composed of clean metal chips and screenings varying from 1¼-in. gauge to dust mixed with 25 per cent of its volume of clean, sharp beach sand, the proportion of cement to aggregate varying from 1 to 5 to 1 to 6. The cost of the actual concrete paving has been approximately 9s. 6d. per sup. yd. in the case of 8-in. work, and 9s. per sup. yd. in the case of the 7-in. work.

As a result of the success that has attended the use of concrete pavements constructed in the manner indicated in the foregoing statement, the Auckland City Council has, for the time being at any rate, abandoned the use of more expensive forms of pavement, and the city engineer has at the present time, in addition to the work already referred to, the following streets authorised, and which he is about to commence:—

(1) Beach-road, over half a mile long and having approximately 11,000 sq. yds. of surface to be paved, exclusive of the tramway tracks, which are under the control of the Auckland Electric Tramways Company.

(2) Anzac-avenue, a new thoroughfare now being constructed by the city council and estimated to cost, including the acquisition of properties, £250,000; length approximately 800 yds.; area to be paved, 9,900 sq. yds., exclusive of centre portion reserved for the tramway tracks.

(3) Symonds-street, portion unpaved; length, 1,050 yds.; area to be paved, exclusive of tramway tracks, 13,400 sq. yds.

These three streets are streets that are either at the present time carrying heavy traffic or will carry heavy traffic as soon as completed.

RECENT PUBLICATIONS.*

Knight's Local Government Reports, Vol. 16, No. 4, April, 1918. London: Charles Knight & Co., Ltd.

Among the cases in the April number of these invaluable law reports, probably the most interesting to surveyors are *Collis* v. *Amphlett*, which raised a question as to the boundary of a common and involved a discussion of the exact boundary where lands are divided by a hedge or ditch; and *Kimber* v. *Gas, Light and Coke Company*, in which was considered the legal liability in case of accidents to a third party of a gas company executing works on private premises. The present issue also contains twelve recent Local Government Board circulars, and the text of all the most recent Orders of the Food Controller. These reports are particularly useful in these days of rapid legislation to the official who wishes to keep himself informed of changes as they occur.

Where the Great City Stands. By C. R. Ashbee. Price 21s. nett. London: B. T. Batsford, Ltd.

The stated object of this book, the sub-title of which is "A Study in the New Civics," is to fix public attention upon the æsthetic movement of our time, to find out what they mean and how they are interwoven. It is not intended to be technical, nor is it written for experts. On the contrary, it is the expression of an eminent architect of the ideals which have actuated his work and an attempt to impress those ideals on the men and women who are waiting for an interpreter of their higher artistic aspirations. The peculiar interest of the book to municipal engineers lies in the fact that it contains an exposition of the application of artistic principles to the problem of town planning. It contains many excellent illustrations both diagrammatic and artistic.

Fuel Overseer Wanted.—Salford Town Council decided on Wednesday to advertise for a fuel overseer at a salary of £300 per annum.

Town Planning in Queensland.—The Queensland Government has decided to hold a town planning conference and exhibition in Brisbane in August this year, and to invite the other States to be represented by exhibits and to send delegates to read papers and take part in the discussions. This will be the second Australian conference on town planning. The first was held in Adelaide in October last year. The Queensland Government has granted £300 to the Queensland Town Planning Association for the purpose of meeting the initial expenses of organising the conference and exhibition.

Corrosion of Ferro-Concrete.—In *Beton und Eisen* for February 5th last a writer, B. Haas, criticises an account given by Dr. Ott in the *Chemiker Zeitung* concerning the corrosion of a ferro-concrete container by gas liquor. The container was in service for some time before the damage became evident. Haas asserts that insufficient data were given from which to conclude that ferro-concrete is unsuitable for use in this service. Ott's statements were not sufficiently definite, and he did not advance any evidence that the ferro-concrete was properly made either in regard to its ingredients or in respect of the treatment which it received prior to being placed in service. Even the composition of the gas liquor was not stated. The author makes suggestions for the composition and treatment of a wall which may be expected to be impermeable and free from corrosion. There is no reason to anticipate either local or general corrosion, even should the concrete be slightly permeable in the first place.

"The Surveyor" Book Department.—Readers of "The Surveyor," especially those serving with H.M. Forces, who experience difficulty in obtaining scientific and technical books are invited to send particulars of their requirements to the manager of "The Surveyor," Book Department, 24 Bride-lane, Fleet-street, E.C. 4.

* Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

THE TRAINING OF ENGINEERS.

DISCUSSION OF MR. SILCOCK'S PAPER.

Following the speeches reported in our last issue, the discussion on the subject of the training of engineers initiated by Mr. E. J. Silcock, M.INST.C.E., at the recent summer meeting of the Institution of Water Engineers, proceeded as follows:—

Dr. H. Lapworth (Westminster) remarked that he quite agreed with Mr. Silcock in thinking that there had been a tendency in universities and technical colleges to make too much of the mechanical side of engineering. Looking back over his own college course, he certainly had far more mechanical work than he wished, or that he had found of benefit since. There were one or two points in the paper where he could not quite agree with Mr. Silcock, although he was in agreement with a good deal of what he said. For instance, as regarded the length of time which the university training should occupy, he (Dr. Lapworth) thought that three years was quite short enough, but, taking Mr. Silcock's two years, he thought it would be physically impossible to cram more into the time than was now done. He knew that seventeen was the general age at which boys went to universities, but personally he thought a boy might very well start at sixteen, especially if he had had a good general education beforehand. Reverting again to the three years as the period at which a boy should remain at the university, as Prof. Jameson had reminded them, in America they had run the course up to four years, and at the Birmingham University the professor in civil engineering there had started a four years' course for those who wished to go on after the ordinary three years were up. He was in thorough agreement with Mr. Silcock that hydraulics needed to be very fully treated. That was one of the most important subjects that a water engineer could study at college. If they were asked what was their great weakness as water engineers, he believed they would all agree that it was on hydraulics. It was very important for a water engineer to be thoroughly acquainted with the principles of hydraulics, and he agreed with Mr. Silcock that that was a subject that ought to be gone into very fully at college. There was one subject he (Dr. Lapworth) would like to lay emphasis on, and that was English. In all the American universities English was made a compulsory subject, he believed, in the engineering curriculum. The students had to write a *précis* report throughout the whole of their college career. It was a most valuable thing to teach a boy how to put his thoughts into writing. He could not agree with Mr. Silcock's suggestion that no attempt should be made to teach a boy drawing at college. It was quite easy to do it; it was done at the Birmingham University twice a week, and it was a great relaxation from the "stuffing" which the boy got in the lecture rooms. As regarded surveying and levelling, he quite agreed they could not be taught properly at the university—there was not sufficient time; but what was taught was very valuable, and gave the student a good start when he went into an office. In America many graduates went straight from the universities into employment. He did not know if they could do it in this country, but it was done in America, and employers were willing to pay for those services. As to the length of apprenticeship, his view was that a three years' course at the university was desirable, and then he would go so far as to say that a year's articles was sufficient, or at the most two years. He agreed that it was most desirable that a young pupil should make himself familiar with the drawings and work going on in the office where he was articled, but a good many consulting engineers would not allow their pupils to look at their drawings, specifications, or prices.

Mr. C. Liddell Simpson (London) said he believed that the young engineer who wished to become a waterworks engineer should go through the shops and learn that part of the profession for at least two years. He did not believe that any engineer could properly appreciate what was necessary for his education unless he had been through the shops, handled the tools, got a good knowledge of the workpeople, and had come to understand generally the running of the shops. Afterwards, in order that he might be able to pass examinations and become an associate member of the Institution of Civil Engineers, it became necessary for him to go to college. A man's education nowadays was not going to be easily accomplished. We should have to fight in the future more or less on the Continental method. In France or Germany no man became properly educated until he was about twenty-five or twenty-six years of age. He (the speaker) did not look upon the theoretical training that was to be got from a professor as being so beneficial as that knowledge which was gained from seeing how the work was actually carried on. A man who worked for a contractor saw all sides of the question, and he learned how to handle people.

Mr. S. C. Chapman (Torquay) said it appeared to him that there were two sides to a water engineer's practice. There were purely mechanical men who dealt with machinery, and on the other hand there were those who never touched a bit of machinery in the whole of their practice—those who were engaged upon gravitation schemes, where machinery was not used at all except in works construction. It seemed to him that what they wanted was to give a broad general engineering education to men who were thinking of becoming water engineers. The question of *viva voce* examination had been referred to, and he could readily understand that the answers given to some of the questions did not come up to the expectations of the examiners. It was not fair to expect a youngster to be able to answer questions on subjects that involved many years of experience before they could be understood.

Mr. R. H. Bicknell (Westminster) remarked that the professors had taken the only line they could take. He agreed with Mr. Willis and Mr. Head that the great thing was for the boy to have a thoroughly practical education, backed up by a theoretical education. There were many things which could not be learned in laboratories or technical colleges, and if he were training his boys at the present time to become water engineers he would first send them for a course of mechanical engineering, after that send them to college, and then apprentice them to some first-rate civil engineer.

Mr. A. B. E. Blackburn (Sunderland) thought that college training should come immediately on a boy leaving school. If he then went into an engineering shop, it caused a break in the theoretical work, and he did not take kindly to going back to college afterwards. There were water engineers whose work lay wholly on the civil side, and others whose work lay wholly on the mechanical side, while others' work lay with both. Take the man in charge of a large pumping undertaking. He would not only have to deal with large service reservoirs and sink wells, but he would also have deep-well pumps to design, and such a man would need to have a knowledge both of mechanical and civil engineering. He did not agree with Mr. Silcock as to drawing and surveying being learned while a man was an articled pupil. Most men were so full up with practical work that they had no time to teach. He looked upon the time he spent in the drawing office and in surveying when he was at the university as being some of the most valuable time which he spent in his educational career, and one of the most valuable things at the university was going round and visiting works, and then making a report on what had been seen. The visits to works which were arranged by the institution were an important means for education, and so was the membership of such an institution.

Mr. F. J. Dixon (South Staffordshire) said he disagreed entirely with Mr. Silcock as regarded the period when a pupil should be taught mechanical engineering and theoretical drawings. He (Mr. Dixon) thought it was most essential that those things should be learned while a boy was getting his technical education. His opinion was that every engineer, whether water or sewage, or whatever branch of the profession he entered, should have two years in the shops. Take the case of a man in charge of the Derwent Valley works, or the Leeds Corporation works and other water undertakings he could mention; how could he give his corporation useful advice unless he had a good knowledge of mechanical engineering? In the case of Hawick, they spent £30,000 on new plant, and unless he had had knowledge of mechanical engineering he could easily have wasted £15,000 or £20,000 for the corporation.

Mr. C. H. Priestley (Cardiff) remarked that, generally speaking, he agreed with the paper. There was one point worth remembering in their study of this question, and that was that many parents, when thinking of a profession for their boys, expected them to earn their living, or something towards it, by the time they were twenty-one. To that end he (Mr. Priestley) agreed that the boy should begin at sixteen. If he had two years' college education and three years' pupilage, that brought him to twenty-one, and after that time he ought to be able to do something to help provide for himself, but as long as he lived he would go on learning.

Mr. Silcock, replying on the discussion, said that it seemed to him that those who had disagreed had principally disagreed with things which he did not say. He agreed with Mr. Priestley that a boy ought to be in a position to earn his own living when he was twenty-one or twenty-two, and that he ought not to have more than five years occupied with his technical education. In order to get a really sound general education, he did not think a boy should leave school until he was seventeen. Then of the next five years the theoretical work should occupy a less period than the practical, because he considered that the practical took longer to acquire than the theoretical. He had reduced the period for the college training because they did not work half their time at college, and a boy got into habits which gave him a wrong idea altogether of what his future life was going to be. If a lad went straight from an ordinary public school into a mechanical engineering shop, or into the office, he had got to put in those longer hours.

Why should he not put them in if he went into a technical college? He did not wish a boy to work all hours of the day as Mr. Head seemed to suggest; he agreed that there must be reasonable and proper time allowed for recreation and sport. He claimed to be a good sportsman, and even to-day he would rather sit for an examination on sporting subjects, or give them any tests they might like to apply in the way of sport or athleticism, than he would go through an engineering test. That was the result of not having too long holidays. One could keep perfectly fit and abreast of all sporting movements without having four or five weeks' holiday in the middle of the summer. He had not said anywhere in the paper that there should not be any mechanical engineering mixed up with civil engineering; what he suggested was that the civil engineer should be separately catered for, and that they should not spend five-sixths of their time on purely mechanical subjects in college. He agreed that if there were time they could not give a boy too much information, but they had got to select those subjects which were going to be of most value to him.

Mr. Dixon remarked that Mr. Silcock said that no attempt should be made to teach mechanical trade.

Mr. Silcock admitted that he said he thought that subject was best left alone by the professors. He had had a good many boys in his office who had been through college courses and come from various technical schools, but he had never had one that he could trust to make a drawing when he came to him, and he had never seen a boy who could make a drawing that was fit to exhibit. If that was the result of their teaching, he said the professors had better leave it alone. It was said that a man had not time to teach a pupil drawing. But surely if a man were a busy man he had got a staff, and he took care to have a good draughtsman, so that the youngsters were properly trained by them. It was said by one speaker that certain engineers did not care to let their pupils take copies of drawings and specifications. All he could say was that such men should not take pupils; if they were going to take pupils, they ought to give them every possible facility for acquiring information.

Mr. T. Wakelam (engineer to Middlesex County Council), who was prevented from attending the meeting, sent the following communication: "I have read Mr. Silcock's paper with a great amount of satisfaction. The subject was referred to by me in an address to a kindred institution some three years ago. I then stated that a boy desirous of entering the profession should, until he is about seventeen years of age, be well grounded, preferably at a public school (with an engineering class on the lines of an Army class), in mathematics, mechanics, physics, chemistry, geology, and geometrical drawing, and if on attaining that age he should enter an engineering college, or matriculate at any one of the universities with a view to taking a degree in science, his studies should be supplemented by laboratory and workshop practice, so that he could combine theoretical study with practice of the kind he would obtain in engineering workshops. He should then be articled, as Mr. Silcock says, for a term of at least three years to a member of the Institution of Civil Engineers. If the boy's parents are not in a position to send him, at the age of seventeen, to either an engineering college or university, the boy should pass, at some educational centre, an examination at least equal to the standard of the matriculation examination of the University of London. He should then be articled in the manner referred to, and should continue his studies by attending evening classes during his pupilage, taking mathematics, physics, chemistry, and geology as special subjects. If established members of the engineering profession generally would make it a condition that one of the above courses of preliminary education must be followed before any boy could be taken as an articled pupil, much good would undoubtedly result. It should be impressed by principals even upon those boys who have satisfied the preliminary educational requirements that, although their training has been satisfactory, years of practical experience will be required to complete their engineering education and to enable them to undertake satisfactorily the work they may be entrusted with. The work of civil engineers is daily growing in importance, and those who are now entering the profession, if they desire to succeed, must be prepared to apply themselves thoroughly to acquiring that extensive knowledge which is becoming more and more necessary as time goes on. Many boys possess a genius for passing examinations and obtaining degrees, but it is only by practical experience that initiative can be developed, which alone will enable the young engineer to grapple with the new and changing problems with which he will be confronted during his professional career. The theorist pure and simple often imagines himself clothed with everything necessary to carry him through life without endeavouring to secure practical knowledge in the drawing office, and (as Mr. Silcock says) by spending time on works, &c., and by making himself efficient in the preparation of reports, plans, specifications, quantities, estimates, &c. &c. Should he go on this principle he will quickly find, in the strenuous days of competition which are undoubtedly in front of all engineers, that he is labouring in a fool's paradise. Such a person will soon find himself left behind in the competition which is bound to arise in connection with the large undertakings which will undoubtedly be carried out in the near future. As one who was engaged in water supply undertakings for some years, it has afforded me great pleasure to add these few remarks on the subject Mr. Silcock has introduced for discussion."

HOUSING NOW AND AFTER THE WAR.

LOCAL AUTHORITIES' PROPOSALS.

The President of the Local Government Board stated in the House of Commons on Wednesday that the total number of local authorities in England and Wales which had intimated to him that houses for the working classes were required in their respective areas was 1,103. Owing to the form in which the replies of the local authorities had been given, it was not possible to state exactly the number of houses they considered necessary, but the number probably would exceed 300,000. In 510 cases the number of houses required exceeded 100.

Falmouth Town Council propose to initiate a housing scheme.

Carmarthen Town Council have appointed a committee to select sites for 200 houses.

Yeovil Rural District Council are considering a plan for a proposed housing scheme at Marston Magna.

Seaham Harbour Urban District Council have decided to erect 153 houses at an estimated cost of £58,381.

Braintree Urban District Council have authorised a committee to consider sites for the erection of thirty houses.

North Bromsgrove Urban District Council propose to erect houses at Lickey End and Rubery at a cost of £472 per house.

Horwich Urban District Council have agreed to a scheme for the provision of approximately 250 houses, and plans are to be prepared.

Briton Ferry Urban District Council have selected a site in proximity to the existing municipal housing scheme for their third scheme, to consist of 130 houses.

Wellington (Salop) Rural District Council have prepared a scheme for the erection of sixty-nine houses in various parishes, at an estimated cost of £300 per house.

Kidderminster Town Council have determined to obtain expert opinion on the details of a housing scheme upon the lines suggested by the Local Government Board.

Depwade Rural District Council have resolved to advertise for a sanitary inspector at a salary of £200 a year to carry out work in connection with a housing scheme.

Leeds Town Council have decided to purchase from the Middleton Estate and Colliery Company an area of 326 acres at the price of £140 per acre, on terms involving the construction of a light railway or tramway to the site from the city, for which the company would give the land and provide ballast; to prepare a scheme for housing on the site and for town-planning lands on the southern portion of the city and the township of Middleton; and to apply for Parliamentary powers to carry out the scheme and to incorporate Middleton within the city.

MOTORS AND MUNICIPAL WORK.

Lewes Town Council propose to purchase a motor ambulance for about £200.

Burnley Electricity Committee propose to purchase an electrically-propelled vehicle.

Stockton Rural District Council have received sanction to purchase a steam wagon.

Maidenhead Town Council have decided to purchase a chassis for the fire engine.

Weston-super-Mare Urban District Council are considering the purchase of a motor fire engine.

Chorley Town Council have appointed a committee to consider the purchase of a motor ambulance.

Ilford Electricity Committee are making inquiries as to the relative cost of steam, petrol, and electric wagons.

Manchester Watch Committee have agreed to purchase two new or second-hand motor chassis, and to build two hose carriages.

Sheffield Health Committee have accepted the tender of Edison Accumulators, Limited, for the supply of two British-built electric chassis.

Cheam Parish Council have requested the Fire Brigade Committee to obtain information as to the means of adapting a manual into a motor engine, at a cost of approximately £200.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week. Other reports will be found on our "Local Government Board Inquiries" page.

BUILDINGS.

East Grinstead U.D.C.—The council propose to apply to the Treasury for a loan of £150 for the establishment and equipment of a national kitchen.

REFUSE COLLECTION AND DISPOSAL.

Burnley T.C.—It is proposed to provide additional plant at the destructor, at an estimated cost of £630.

Hythe T.C.—The borough surveyor, Mr. J. S. Green, has prepared a scheme for an improved system of dust collection, which has been referred to a committee for consideration and report. Mr. Green was complimented by the mayor and councillors upon his report.

ROADS AND MATERIALS.

Amphill R.D.C.—Application is being made to the Road Board for a further sum of £400 for repairs to Longsdale-road.

Canterbury T.C.—With respect to machine spraying, the city surveyor, Mr. A. C. Turley, has been asked to confer with the county surveyor to obtain information with respect to facilities and prices.

Easington R.D.C.—A resolution having been received from the West Hartlepool Town Council that it was not their intention to take further steps in the matter of the proposed coastal road from Easington to West Hartlepool, the rural council have decided to approach the county council with a view to securing their interest in pressing forward the scheme for their own district from Easington to Blackhall.

Hailsham R.D.C.—Answering an objection to a proposal to invest a balance of £2,000 in War Bonds, the chairman, Mr. G. W. Deadman, said the roads were going to rack and ruin, and the council were saving money to expend upon them whenever the opportunity arose. Would the ratepayers be prepared to find £10,000 after the war for road construction? Another councillor said that as the council could not obtain road materials now they were investing the money until such times as they could get them.

Naas U.D.C.—The surveyor, Mr. R. H. Hall, has received instructions to prepare a revised statement of the details of road cost, specifying the roads which he considers should be let by contract, and at what price.

Navan R.D.C.—In his report the surveyor stated that the cost of rolling in materials was now very excessive, but as there was such an accumulation of stone along the roads in Slane section it was necessary to make every effort to get it rolled in. The cost of coal for the roller was 70s. or more per ton. The roads generally were in a fair condition, and most of the main lines were well maintained.

Reading T.C.—The borough surveyor, Mr. J. Bowen, has prepared plans, sections, and estimates of the probable cost of improvements in four streets, the work to be carried out after the war.

Renfrewshire C.C.—The road surveyor for the Upper District, Mr. Robert Drummond, reports that, considering existing conditions, the roads have been well maintained. The evolutionary process from the old to the new method of laying and binding new metal coatings with bituminous materials on the principal roads, began a number of years ago, will be completed this summer. The Road Board have again given a grant of £1,000 for the current year to aid in surface spraying and keeping the main roads up to their present standard with bituminous materials. The estimates amount to £31,177, an increase of £1,886, which is wholly accounted for by the increased price of materials and haulage.

Taunton T.C.—The borough surveyor, Mr. D. Edwards, reported that, owing to the difficulty of obtaining materials, especially grit and chippings, he was making arrangements to fix up temporary plant for the mixing of clinker and Mexphalte, so that the clinker might be given a trial on the surface of some of the roads.

Tipton U.D.C.—It is proposed after the war to construct a new road from Park-lane West to Union-street, and from Alexander-road to Oakes Hill.

Torrington T.C.—The borough engineer and surveyor, Mr. Harold Settle, has prepared plans and estimates for an improvement to the Torrington-South Molton main road at Leighty Water. These the town council approved, and resolved to forward them to the Devon County Council for their consideration. The approximate cost is £490. The borough engineer and surveyor was complimented on the manner in which he had drawn the plans.

SEWERAGE AND SEWAGE DISPOSAL.

Beeston U.D.C.—The financial affairs in connection with the farm and sewage disposal works have been adversely criticised by the Finance Committee, which suggested better organisation, in order to attain a higher state of efficiency.

Halstead U.D.C.—The Sanitary Committee submitted a report on drainage defects, and with respect to Mount Pleasant it was resolved to ask the Local Government Board to sanction a loan of £300 for the construction of a new sewer, the work being very urgent.

Somerset C.C.—The Health Committee reported that the Dulverton Rural District Council had resolved that a comprehensive scheme for the disposal of the sewage of the town of Dulverton be carried out after the war, and that the approximate quantities of materials required to carry out such a scheme be estimated by the sanitary inspector and entered in the return received from the Ministry of Reconstruction. In answer to inquiry by the clerk as to whether they intended to dispute the fact of pollution, they replied stating that they did not admit any such pollution. The county council resolved to commence legal proceedings against the rural council, with power of suspension for a certain period until they were satisfied that admission had been made and a proper undertaking given.

Swansea T.C.—Mr. Midgley Taylor gave evidence before the Select Committee of the House of Commons with reference to the sewage disposal and drainage proposals in the Swansea Extension Order. There was urgent need, he stated, for a drastic improvement of the sewage disposal system. Every precaution had been made to minimise any possible nuisance at the outfall works. The discharge would take place at certain hours of the day when the outgoing tide would carry the sewage into the true tide of the Bristol Channel, and it would be carried out to sea. It was also proposed, Mr. Taylor added, to enlarge the area of the drainage scheme, the object being to throw open a very large residential neighbourhood, facing Swansea Bay, for building purposes, which, without the proposed drainage scheme, never could be developed. The present estimated cost of the sewage disposal works was £580,000.

WATER, GAS, AND ELECTRICITY.

Birr U.D.C.—The council propose to proceed with a scheme of electric lighting, for which purpose water power facilities have been granted by the Earl of Rosse.

Blackburn R.D.C.—A committee has been appointed to deal with proposals for the improvement of the Feniscowles water supply.

Dumfriesshire C.C.—In order to supplement the water supply in Eaglesfield special district the Annan District Committee have resolved to acquire an additional spring at Darlawhill, and to carry out the necessary work as soon as the consent of the county council is obtained. The cost of the scheme, including the cost of the land, is approximately £145.

Edinburgh T.C.—For the fourth year in succession there has been a deficiency on the electric lighting account, amounting in the aggregate to £21,946, which has been met by a draft from the reserve fund.

Hammersmith B.C.—The Electricity Committee recommend the borough council to expedite the linking-up scheme with the electricity undertakings of Fulham and Battersea.

Hythe T.C.—The borough surveyor, Mr. J. S. Green, has submitted an amended scheme for new cast-iron mains throughout the whole system where steel mains are now laid. The estimate for the whole work was £4,300. The estimate and plans have been approved, and the town clerk was directed to apply to the Local Government Board for leave to borrow money for the work.

Nottingham T.C.—The committee appointed to consider the national scheme being prepared by the Government for the better utilisation of the coal resources of the country, and for the generation and distribution of electricity from a limited number of central stations, has submitted a report showing that Nottingham possesses all the essential factors required in any area for a station of this character. Taking 40 miles as a radius over which electric power can be economically supplied, the following come into the area: Sheffield, Chesterfield, Mansfield, Newark, Retford, Lincoln, Nottingham, Loughborough, Leicester, Kettering, Burton-on-Trent, Derby, and Ilkeston, and other smaller towns, and numerous works in the various counties. The site, it is suggested, should be near the Trent. It will be necessary very carefully to consider the position of

existing gas undertakings, and it is proposed that the council should take expert advice on all details, so that a full investigation can be made as to the most suitable site, &c.

Stoke-on-Trent T.C.—The town council have resolved to obtain the advice of Sir John Snell with respect to a proposed scheme for the extension of the electricity undertaking.

Wolverhampton T.C.—After payment of the interest and sinking fund, the loss on last year's account of the water undertaking was £4,567, which will be met out of the improvement fund.

MISCELLANEOUS.

Bognor U.D.C.—The clerk submitted the new order for rationing fuel and lighting, and explained that the maximum salary for the executive officer, who it was suggested should be the surveyor to the local authority, would be £100, and the maximum administrative expenses £40. Only two-thirds of those amounts would be paid by the Government. Mr. Staffurth doubted whether Mr. Bridges would have the time to devote to the scheme. Mr. Lovett: You are piling one thing on another on the officers, and they are already piled up with work. Mr. Staffurth's amendment that the question be referred to a meeting of the Special Purposes Committee was passed, Mr. A. O. Bridges, the surveyor, remarking that after the discussion he should like his name left out of the question altogether.

Newport (Mon.) T.C.—The town council have deferred till after the war the question of providing facilities for cremation.

Somerset C.C.—The County Works Committee reported that on the question of reconstruction and transport the replies received from district councils suggested the construction of light railways in special districts and the provision of several motor services. The chairman said the Ministry of Reconstruction were drawing up a list of work to be undertaken all over the country when the proper time arrived, and if the war did not go on too long there would be a large number of lorries available for motor traffic.

PERSONAL.

Mr. J. A. Robson, Esh Winning, has been appointed temporary surveyor to the Brandon Urban District Council.

Mr. T. Rees, surveyor to the Usk (Mon.) Urban District Council, has been appointed an official under the Household Fuel and Lighting Order.

Lieutenant E. B. B. Newton, borough surveyor of Paddington, has been reported "missing" since the recent heavy fighting on the Western front.

Mr. Glass, temporary assistant borough surveyor of Colchester, has been appointed temporary surveyor to the Uttoxeter Urban District Council.

Mr. J. A. Ardern, of Sheffield, has been appointed deputy superintendent of refuse disposal to the Birmingham City Council, at a salary of £340 a year.

Mr H. Weller, surveyor to the Chailey Rural District Council, has been voted an honorarium of £10 for assistance rendered to the clerk in connection with the coal service, on which there was a profit of £30.

Mr. A. Burton, borough engineer of Stoke-on-Trent, has undertaken two months' service with the first 15.000 volunteers, being in command of a Special Service Company from Staffordshire engaged upon work for the Royal Defence Corps.

Mr. Arthur Norman Garrard, F.S.I., of the firm of Messrs. Daniel Smith, Oakley and Garrard, 4 and 5 Charles-street, St. James's-square, S.W. 1, has been elected honorary secretary of the Surveyors' Institution in the place of the late Mr. Percival Currey. Mr. Garrard was professional associate of council from 1899 to 1904.

OBITUARY.

Mr T. C. Wiggin, superintendent of minor roads in the North Central Province of Ceylon, was killed on May 18th in the Tamankadua district of that island. Hearing that a rogue elephant was haunting Yakure, where it had killed a boy, he tracked it down, and, after firing several shots without effect, hid behind a bush, where he was discovered and trampled so badly that he died while his servants were carrying him in from the jungle. Mr. Wiggin, who was trained as an engineer at the Government factory in Colombo, had spent his life in Ceylon. He was a keen sportsman, had shot thirty-five rogue elephants, and had a fine collection of hunting trophies.

KILLED IN ACTION.

Lieutenant A. S. Knott, a member of the clerical staff in the Paddington borough surveyor's department, has, we regret to state, been killed in action in France. He joined the colours soon after the outbreak of war.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. The letter X, combinations such as X.Y.Z., and words such as "engineer" and "surveyor," should never be used.

Highway Passing Under Bridge.—"Gradient" writes: An old road in this district, which is a public highway reparable by the council, passes under a railway bridge at a gradient, being higher at one side of the bridge than at the other. Are the council under any obligation to level the road, and would they be liable in the event of an accident occurring to a person driving under the bridge?

Assuming that the bridge was in existence at the time that the road became a public highway, the council, in my opinion, are not bound to level the road, nor would they be liable in the event of such an accident as suggested. See *Warner* v. *Wandsworth District Board of Works* (53 J.P., 471).

New Street: Power of Local Authority to vary Termination.—"Thoroughfare" writes: Plans have been submitted to the council of an intended new street, leading out of an old road, and terminating in an open field, at a point about 20 yds. short of another road. The level, width and construction of the street, as shown on the plans, are in accordance with the by-laws, but the council consider it very desirable that it should be lengthened so as to have an outlet into the second road. Have they any power to enforce this, and if so under what Act?

If sec. 17 of the Public Health Acts Amendment Act, 1907, is in force in the district the council can by order vary the intended position, direction or termination of the new street, so far as may be necessary for the purpose of securing more direct, easier, or more convenient means of communication with the second road, or an adequate opening at that end of the new street, unless it is shown to their satisfaction that compliance with such an order would entail the purchase of additional land by the landowner, or the execution of works elsewhere than on his land. But unless this section is in force the council have no control over the length of the street, nor can they insist upon its having a second outlet.

LOCAL GOVERNMENT BOARD INQUIRIES.

The Editor invites the co-operation of Surveyor *readers with a view to making the informaton given under this head as complete and accurate as possible.*

APPLICATIONS FOR LOANS.

Lowestoft T.C.—£5,276 for sea defence works.

Spenborough U.D.C.—£3,301 for an additional retort setting at the gasworks.

LOAN SANCTIONED.

Elland U.D.C.—£2,000 for the extension of the electricity works.

FORTHCOMING INQUIRY.

JULY.	£
24.—**Birmingham.** For sewage disposal works (Mr. P. M. Crosthwaite)	89,581

The Tribunals.—At Hastings Tribunal the borough engineer applied for a gardener and groundsman, forty-seven, Grade 2, and a Grade 1 gardener and propagator, and reminded the tribunal of one of his Grade 1 gardeners who was employed solely on the R.A.F. ground on joining the Army. The chairman said that it would greatly facilitate the adjudications of tribunals if such things were remedied. They refused the application for the Grade 1 man, and gave the Grade 2 man two months.

Cardiff Municipal Employees' Wages.—Sir George Askwith has given his award in the Cardiff municipal employees' dispute. To women of eighteen years of age and over, for a full recognised week's work, he awards 7s. 6d. per week, or a due proportion for a part of the week. Boys under sixteen no bonus. Boys of sixteen to eighteen a bonus of 9s. for a full recognised week's work of six or seven shifts, or a due proportion for a part of the week. Men age eighteen and over to receive 20s. a week over their pre-war wages, payable at the rate of 3s. 4d. per day or per shift for each day or shift worked. The employees express general satisfaction over the award, and state that they will abide by it loyally.

Road Damage by Timber Haulage.—Asked whether he was aware that during the past year damage estimated at £24,373 had been caused to main and other roads in eighteen of the urban and rural districts of Devonshire, as a result of timber haulage, and whether consideration would be given to the reimbursement of highway authorities, the President of the Board of Trade stated in the House of Commons that arrangements had been made for dealing with extraordinary claims for damage to roads by timber haulage, whether by the Timber Supply Department or private timber merchants, in cases where the timber was to be used for purposes of national importance. Such claims would be dealt with by the Lands Branch of the War Office under Treasury instructions and in consultation with the Road Board.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Would one have thought it possible that the inhabitants of Paris should be exercised in their minds at the present time about the vibration of some of their large buildings owing to the heavy traffic in the streets? Is it not, however, interesting to read that experts having studied the question are constructing between the streets and the basement walls of the buildings walls made of some form of cork composition which are said to have stopped the vibration where they have been introduced? Does it not show that experts in various professions are not deterred by our surroundings from continuing their scientific investigations?

* * * *

Was it not a very public-spirited action on the part of the owners of land to give up, free of cost, all the land required for widening the road between Newton-le-Willows and Bedale at various points which were considered to be dangerous? and is it not to be regretted that this excellent spirit is not more generally in evidence when public improvements are required? Is it not clear that nearly all such improvements tend to benefit the owners of the adjacent lands, and that it is a narrow and short-sighted policy to try and squeeze the local authority when these improvements are contemplated? What about the "betterment" clauses in some of our Acts of which we have lately not heard very much?

* * * *

What has become of the de-tinning process of which we heard so much a year or so ago? Have any installations been started; and, if so, with what success?

* * * *

Is it not to be regretted that there is in this country no department for collecting, co-ordinating and issuing information with regard to roads, sewerage, sewage disposal, water supply and distribution, and many other subjects of interest to municipal engineers? Would not such information, if prepared and regulated under the guidance of a capable staff, be of the greatest value to the profession and also of national advantage? Is it not to be hoped that after the war the Government will see the necessity for something of the kind and institute something in the nature of an international technical information bureau?

* * * *

What is the council of the Institution of Municipal and County Engineers going to do with reference to the serious menace which at present exists in the possibility that the control of our roads and bridges may come under military instead of civil management? Should not a special meeting of the council be called at once with a view to more drastic measures being taken to nip any such proposal in the bud? If, on the other hand, the council should find that there is no danger of the control of the roads and bridges being taken out of the hands of their members, should they not issue a manifesto to this effect and thus allay the alarm which is now felt?

* * * *

Does not the recent accident by the upsetting of a tramcar at the curve near Blackfriars Bridge point to the danger of tram lines or road railways due to the fact that a super-elevation of the outside rail is impossible for such structures? As this is the case, does it not prove that our streets were never intended for tram rails, and that so long as they exist they constitute not only an obstruction to traffic, but also a serious source of danger unless curves are taken at very low speeds?

MUNICIPAL PIG-KEEPING.

EAST BARNET URBAN COUNCIL'S FARM.

Mr. H. S. Cautley, M.P., of the Board of Agriculture, recently performed the ceremony of opening the East Barnet Urban District Council's pig farm at Cat Hill, East Barnet. The premises which are being made use of are being rented by the local authority, and stable buildings, cow-byres and sheds have been adapted for the purposes of the scheme. At the date of opening there were sixty-seven pigs on the farm. More than 300 householders reserve their edible refuse for the animals, and at present this is being collected about twice weekly.

The farm, in the establishment of which Mr. H. York, Assoc.-M.Inst.C.E., the council's surveyor, has had a considerable share, is in an ideal situation, and the arrangements are all that could be desired. The sties are substantially built, the main structures being of wood on brick foundations with tiled roofs. Half channels of earthenware firmly cemented to the ground form the feeding places or troughs. There are six breeding pens, each fitted with strong protecting rails to obviate the danger of the small animals being pinned to the walls by the sows. Eleven pens are suitably arranged for fattening purposes. These are spacious and well paved. Other features are a food-mixing room, a large copper house and ample storage accommodation. All the buildings are provided with an ample supply of water.

APPOINTMENTS VACANT.

Official and similar advertisements received up to 4.30 p.m. on Thursdays will be inserted in the following day's issue, *but those responsible for their despatch are recommended to arrange that they shall reach* The Surveyor *office by noon on* Wednesdays *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

SURVEYOR OF HIGHWAYS.—July 22nd.—St. Germans Rural District Council.—Mr. F. E. Cleverton, clerk, 4 Buckland-terrace, Plymouth.

TEMPORARY BOROUGH SURVEYOR AND INSPECTOR.—July 26th.—Marlborough Town Council. £200 a year.—Mr. E. Llewellyn Gwillim, town clerk, Town Hall, Marlborough.

TEMPORARY ARCHITECTURAL ASSISTANT AND SURVEYOR.—July 27th.—Swindon Town Council.—Mr. R. Hilton, town clerk, Town Hall, Swindon.

TEMPORARY ASSISTANT SURVEYOR.—July 30th.—Devon County Council.—Mr. R. M. Stone, county surveyor, No. 1 Division, The Square, Barnstaple.

TEMPORARY ENGINE-DRIVER.—July 30th.—Stourport Urban District Council.—Mr. A. D. Capel Loft, clerk, Council Offices, Stourport.

SURVEYING AND ARCHITECTURAL DRAUGHTSMAN.—Birmingham City Council. Three guineas per week.—Mr. Henry E. Stilgoe, city surveyor and engineer, The Council House, Birmingham.

TEMPORARY SURVEYOR AND INSPECTOR OF NUISANCES.—August 5th.—Yiewsley Urban District Council. £200 a year.—Mr. W. H. Lea, clerk, Council Offices, Yiewsley, Middlesex.

MUNICIPAL CONTRACTS OPEN.

Official and similar advertisements received up to 4.30 p.m. on Thursdays will be inserted in the following day's issue, *but those responsible for their despatch are recommended to arrange that they shall reach* The Surveyor *office by noon on* Wednesdays *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Engineering: Iron and Steel.

GILLINGHAM.—July 22nd.—For the supply and erection of one combined Diesel engine and alternator.—Mr. F. C. Boucher, town clerk, Corporation Offices, Gillingham.

FOLESHILL.—July 30th.—For sale, an 8-in. bucket and ram bore-hole pump, by Tangye, Birmingham.—Mr. A. E. Newey, engineer and surveyor, Rural Council Offices, Foleshill, Warwick.

BELFAST.—August 16th.—Supply of electricity plant.—Mr. T. W. Bloxam, city electrical engineer, Belfast.

CHELTENHAM.—For the supply of tar-macadam and screening plant, new or second-hand.—Mr. J. S. Pickering, borough engineer, Municipal Offices, Cheltenham.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories, &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

Roads.

MERTHYR.—July 22nd.—Supply of limestone, macadam, gravel and chippings, granite or basalt, tar-macadam and chippings.—Mr. T. Aneuryn Rees, town clerk, Town Hall, Merthyr.

WOODBRIDGE.—July 23rd.—For the supply of 282 tons of broken granite, $1\frac{3}{4}$-in. gauge.—Mr. W. Brooke, Urban Council Offices, Woodbridge, Suffolk.

SHEERNESS.—July 24th.—Supply of 200 tons of broken stone.—The Surveyor and Chief Engineer, Council House, Sheerness.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

JULY.

19-20.—Institution of Municipal and County Engineers: Meeting at Stretford.
20.—Association of Managers of Sewage Disposal Works: Annual summer meeting at West Bromwich.
27.—Royal Sanitary Institute: Sir Henry Tanner on "Housing, from the Point of View of Economy in Planning and Construction." Ipswich Town Hall, 11 a.m.
27.—Institution of Municipal and County Engineers: Meeting at Maidstone.
27.—Institution of Municipal Engineers: Eastern and North-Eastern District meeting at Spalding.

AUGUST.

16-17.—Institution of Municipal and County Engineers: Meeting at Abergavenny.
19-20.—Institute of Cleansing Superintendents: Annual conference at Stockport.

APPOINTMENTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

CITY OF BIRMINGHAM.

Applications are invited from men ineligible for Military Service for the position of Temporary Surveying and Architectural Draughtsmen in the Housing and Town Planning Department at a weekly salary of three guineas.

Candidates must have had experience in the laying out of large estates, be accurate and expeditious levellers and surveyors and a good draughtsman.

Applications, stating age, experience, present employment, reason why ineligible for Military Service and accompanied by three recent testimonials, should reach me without delay.

HENRY E. STILGOE, M.INST.C.E.,
City Engineer and Surveyor.

The Council House,
Birmingham.
July 10, 1918. (3,829)

BOROUGH OF MARLBOROUGH.
TEMPORARY SURVEYOR AND INSPECTOR OF NUISANCES.

The Town Council invite applications for the joint offices of Surveyor and Inspector of Nuisances during the absence of their regular Officer on Military Service.

The person appointed will be required to devote the whole of his time to his duties, and must be fully competent to perform all the duties of a Surveyor (including Highways) and Inspector of Nuisances, and to superintend the management of the Sewage Works (Septic Tank) Waterworks, and Collection of Water Rents.

Further information as to the duties may be obtained on application to the undersigned.

The Salary will be at the rate of £200 per annum.

Office accommodation with stationery will be provided by the Council.

The person appointed will be required to conform to the regulations of the Local Government Board from time to time affecting Inspectors of Nuisances, and, subject to the sanction of the Board, the proportion of salary allotted to the Office of Inspector of Nuisances will be £75.

The appointments will be subject to determination by one month's notice on either side.

Security in the sum of £200 by a Guarantee Policy will be required.

Canvassing, either directly or indirectly, is prohibited, and will disqualify.

Applications, endorsed "Surveyor and Inspector of Nuisances," accompanied by copies of not more than three testimonials, must be sent so as to reach the undersigned not later than Friday, the 26th inst.

(By Order)
ED. LLEWELLYN GWILLIM,
Town Clerk.

Marlborough.
July 16, 1918. (3,830)

DEVON COUNTY COUNCIL.
TEMPORARY ASSISTANT SURVEYOR.

Applications are invited for the post of temporary Assistant Surveyor to take charge of about 42 miles of Main Road in the Bideford Rural District.

Applicants must thoroughly understand the disposition of labour and the care of machinery employed in quarries and road making, and be capable of riding a bicycle or motor bicycle, for which an allowance will be made.

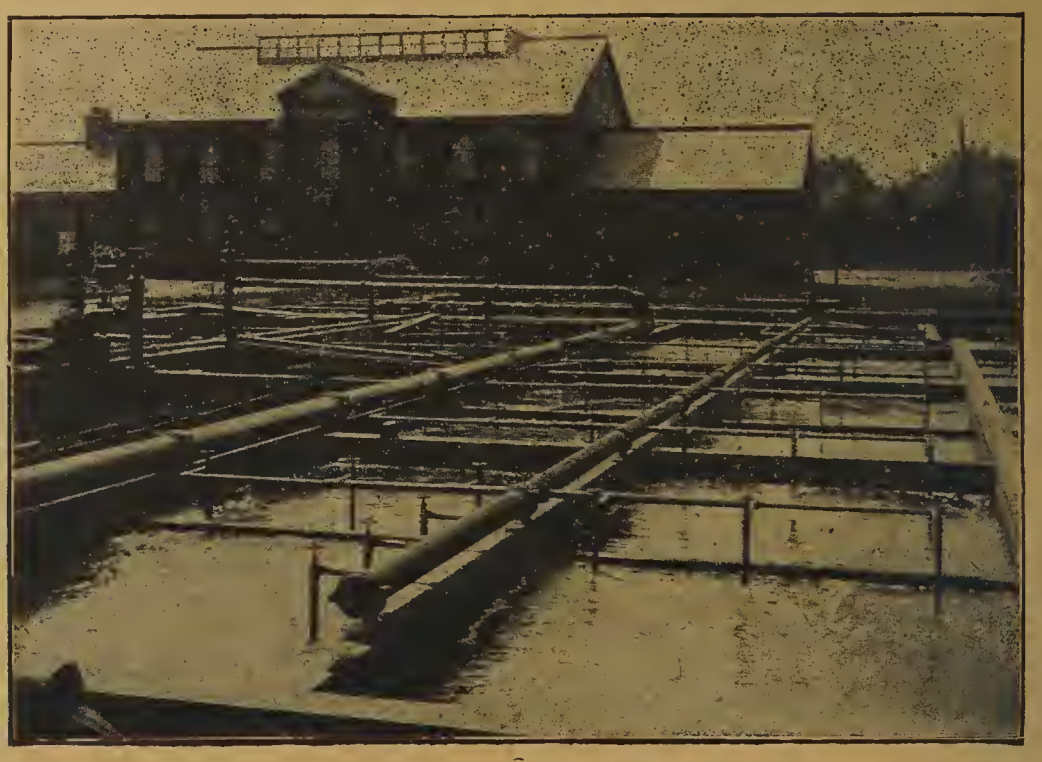
Applications, stating experience and salary required, endorsed "Temporary Assistant," and accompanied by not more than three recent testimonials, must reach the undersigned not later than July 30th, 1918.

R. M. STONE,
County Surveyor,
No. 1 Division.

The Square,
Barnstaple.
July 13, 1918. (3,827)

Activated Sludge System of Sewage Purification

See "The Surveyor" issued 15th June, 1917.



THE ACTIVATED SLUDGE SYSTEM AT WORCESTER.

For further particulars write for Booklet S 52 to :—

Jones & Attwood, Ltd.,
Stourbridge.

Telegrams: "Heat, Stourbridge." Telephone: No. 10.

Specialists in Sewage Apparatus, "J and A" Sewage-wheel Distributors, Booklet S 39,
"J and A" Sewage Ejectors, Air Lifts, &c., Booklet S 48.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. JULY 26, 1918. No. 1,384.

Minutes of Proceedings.

Fuel Rationing. A feature of the meeting of the Institution of Municipal and County Engineers held at Manchester on Saturday afternoon last was an address by Mr. E. Witton Booth, ASSOC. M.INST.C.E., barrister-at-law, an associate member of the institution, who has been appointed by the Board of Trade a divisional officer under the Household Fuel Board of Trade a divisional officer under the Household Fuel and Lighting Order for the West Riding Division of Yorkshire. Mr. T. W. A. Hayward, president of the institution, presided, and, as might have been expected in view of the fact that many municipal engineers are being appointed as local fuel overseers, there was an exceedingly large attendance of members. It was a happy idea upon the part of those responsible to depute Mr. Booth to speak on the Order, in view of his long connection with the institution and his practical acquaintance with municipal engineering work. The necessity for the Order is obvious upon very slight reflection, not only because of the withdrawal of a large number of miners for active service, but also because of the paramount needs of our Allies and the Navy, and the restriction of coast shipping, with the consequent increase of transport difficulties. The simple fact is that the public must be educated to a realisation of the present position by every possible means. One method of domestic saving is by means of a better utilisation of cinders, and it is suggested that this might be checked by keeping some observation on the character of the refuse in the dust-bin. This, however, is a point of detail, and municipal engineers will in many cases have more important and definite duties allotted to them in the execution of the Order. The central organisation for carrying out the scheme forms a distinct branch of the office of the Controller of Coal Mines; but it has wisely been decided to decentralise the detail work as much as possible. For this purpose the country has been divided into areas for "divisional control," each of which comprises the areas of several local authorities, whose districts will form the administrative units. The account given by Mr. Booth of the duties to be performed by those selected to act as coal overseers should prove of immediate value to the members of the institution.

* * * *

Recent Legal Decisions. From the May and June issues of *Knight's Local Government Reports*—a periodical publication which contains all the information which the local government official can require in regard to current legal matters—we select two cases for comment which are of special interest to municipal engineers. In *Broadbent* v. *Rotherham Corporation (No. 2)* the defendant council had made orders under sec. 18 of the Housing, Town Planning, &c., Act, 1909, for the demolition of certain houses owned by the plaintiffs. At a time subsequent to the making of these orders the plaintiff had submitted plans and specifications for making the houses fit for human habitation, and in an action against the corporation had obtained an order directing them to consider the matter according to law and an injunction to restrain them from proceeding to carry out the demolition orders. Upon consideration of the matter in alleged obedience to this order, the corporation, acting on the report of a committee, came to the conclusion that the houses were incapable of being rendered fit for human habitation; but they refused to furnish the plaintiff with a statement as to the reasons which led them to this decision. In the present action it was alleged (unsuccessfully) that they had not decided the matter judicially, it being held that they were not bound to disclose their reasons in detail. In the other case to which we refer the Bromley Rural District Council were the defendants in an action founded upon interference with a natural stream by the discharge of surface water from a street which had been made up under the Private Street Works Act, 1892. It was held as a matter of law that where there is a natural flow of water in a defined natural channel for a certain distance and, lower down stream, owing to the physical or geological condition of the soil, the water becomes gradually absorbed in the land the stream is none the less a natural stream. The action was nevertheless dismissed because it was further held that in ascertaining whether the draining of surface water from a waterproofed area into a natural channel has appreciably increased the flow in that channel, regard must be had to the small extent of the newly waterproofed area in comparison with the whole of the watershed drained by the channel.

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Road Problems in America and New Zealand. The pressure of war and consequent railway congestion is tending to concentrate attention upon the condition of roads in America, and this finds expression in a letter submitted by the Council of National Defence to the state councils, urging that all plans for road construction and maintenance should be viewed in the light of war conditions, and expenditure of labour and materials should be directed only to those roads which are of prime importance for economic and military purposes. The proposals are in substance analogous to our own, in so far as they assign a first place to traffic of vital importance to the conduct of the war, and the distribution of food supplies. At the same time the movement will inevitably have far-reaching effects upon road problems in America, for it is recognised that once a start has been made upon the path of improvement, highway transportation will be immensely increased, and a new era of road construction and maintenance introduced after the war. It is only natural that in other parts of the world the influence of progress should make itself felt as the result of the war. We read for example that in New Zealand, the development of the rural districts by the agriculturists, and the general use of the motor car has brought the necessity for better highways to the front. A plan is proposed for the construction of the main roads with concrete, and to provide macadam roads as feeders. This, of course, will necessitate the employment of a large amount of machinery, and this market should certainly be worth cultivating by British firms after the war. The construction of the trunk roads will be undertaken by the New Zealand Government, and the feeder roads by the local district road boards.

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Salaries in Ireland. In comparison with the high rates of wages which are being earned to-day by skilled and unskilled labour, a salary of £150 a year can hardly be regarded in any circumstances as adequate for a responsible official appointment. Yet this is the remuneration being offered by the Kerry County Council for an assistant county surveyor, who must "either be a member of the Institution of Civil Engineers or pass the examination for assistant surveyors held each year by the Local Government Board." The duties are stated to consist in the superintendence of the direct labour scheme, measuring material for roads, and inspection of roads worked under the contract system. The particulars conclude with the two laconic statements that the appointment is temporary, and that travelling expenses are not allowed. We are really not aware whether the advertisement of the Kerry County Council is issued with the knowledge or consent or has the official sanction of the Local Government Board for Ireland. Be this as it may, however, to couple such a salary with the qualifications required argues a totally inadequate appreciation on the part of those

responsible of the present-day value of professional services of a highly important and technical character. It might afford them a salutary lesson if intending applicants were to adopt the suggestion of our correspondent "Lux in the Army," and, ignoring the salary stated in the advertisement, were to offer their services at their own reasonable figure.

HOUSE REFUSE COLLECTION.

ELECTRIC MOTOR VANS AT WORTHING.

The Worthing Corporation have recently considered the question of the collection of house refuse by electric motor vans. Mr. Frank Roberts, ASSOC.M.INST.C.E., the borough surveyor, in his report gives the estimated cost of collecting and delivering to refuse destructor by horse and by electric vehicle as follows:—

A great saving would be made in the time occupied by the two vehicles in "collecting" and "travelling."

From experiments made by the surveyor to the Barnes Urban District Council it was found that the motor-van was able to spend more than double the time in "collecting" than the horse-van each day.

In Worthing the distance from the north-west corner of the borough is about 3¾ miles from the refuse destructor, which with a full horse load would occupy a horse and cart a considerable portion of the day in "travelling." It is in the West Worthing, Tarring, and Broadwater districts where the motor vehicle would prove an undoubted saving.

HORSE VEHICLE.

The total of house refuse collected for the year ended March 31, 1918, amounted to 6,500 tons, or 21 tons per working day. This amount was collected by an average of eleven horses and carts daily, so that each horse and cart collected 1 10-11ths tons per working day.

	s.	d.
Cost of horsekeep, harness, shoeing, carts, depreciation, &c., per working day	6	0
Wages of man per working day	6	6
Total cost of horse, cart and man, per working day...	12	6
Cost of collecting per ton by horse vehicles	6	6

ELECTRIC VEHICLE.

Price of vehicle, £1,033 10s.; average load, 2 tons.

	£	s.	d.
Annual loan repayment and interest at 5 per cent (sanction assumed for ten years)	132	13	0
Current, 36 units per day, at 2¼d. per unit, for 300 working days	101	5	0
Maintenance, 6,000 miles per annum, at 1d. per mile	25	0	0
Tyres, three-fifths set per annum, at £50 per set	30	0	0
Insurance, third party accident, &c.	12	0	0
Annual re-paint, &c.	5	0	0
Wages of driver per annum	100	0	0
Wages of filler per annum	90	0	0
Total cost per annum	495	18	0
Total cost per working day	1	13	0
Assuming vehicle fills three times a day cost per ton would be one-sixth of £1 13s.	0	5	6

Saving of electric vehicle over horse-drawn vehicle, 1s. per ton.

Sewage Works Managers' Summer Conference.—The annual summer conference of the Association of Managers of Sewage Disposal Works was held on Saturday last at West Bromwich, the members being received at the town hall by the mayor, Councillor T. Sansome. Following the delivery of the presidential address of Mr. J. E. Willcox, M.INST.C.E., a paper, descriptive of the West Bromwich sewage disposal works, was read by the borough engineer, Mr. A. D. Greatorex, M.INST.C.E., and another dealing with the treatment of sewage on land and its possibilities in relation to food production, was submitted by Mr. A. V. Reynolds, Stoke-on-Trent. The proceedings will be referred to at greater length in a future issue.

Municipal Housing in Canada.—As the result of conferences between the Ontario Government and the Provincial Housing Commission, Mr. Hearst, the Premier, announces that £40,000 will be set aside for urban and rural municipalities for housing at 5 per cent. No house may cost more than £500, and the character of the buildings and their location must be approved by the Government. It is further provided that the total amount lent up to the end of 1919 shall not exceed £400,000, and any municipality receiving a loan from the Government must add 25 per cent to the amount received. Municipalities may undertake direct building operations, or they may act through private builders or housing committees, but the Government will lend only to municipalities.

CORRESPONDENCE.

(One man does not see everything.)
—EURIPIDES.

SURVEYORS' SALARIES.

To the Editor of THE SURVEYOR.

SIR,—This subject has been much written upon and discussed, but the results so far have not been very favourable.

My object in writing is to convey to others, through the medium of your paper, two ideas which, if carried out, might have some good effect.

(1) When an appointment is advertised, as we know, the salary is generally fixed. Now supposing a man is very keen to get a certain job, yet cannot accept the salary offered, what is there to deter him from applying for that job and stating clearly in his application the salary he would expect for the qualifications and experience he offers? No doubt many readers would consider it waste of time and money; but I feel sure that some fair-minded councillors would see the force of it and prefer to give their surveyorship to a well-qualified, experienced man rather than to a man of indifferent qualifications, even if they had to pay a little more to get him. This is an idea for individual surveyors to act upon, and I would remind them that "Nothing venture, nothing have."

(2) What a pity it is that the Institutions of Municipal and County and Municipal Engineers do not join forces. Why do they not? The push and live nature of the latter, combined with the conservativeness of the former, would mean a strong, reliable body. The "nominal roll" of the combined institutions would be a long one, and representative of both high and low in the profession. It would mean more power, only one subscription (perhaps a lower one), and better attendances at meetings, especially at the sub-district ones, and it is at these meetings that the spade-work to improve the surveyor's status could be done and the suggestions polished off at the annual meetings, especially if the President of the Local Government Board can be induced to attend.

The above is a necessary preliminary to my second thought.

Supposing we have the combined institution, every chief appointment in the United Kingdom could be tabulated with particulars of duties and a minimum salary to commence fixed by a committee. Should any appointment be offered at a less salary than that fixed it should be black-listed to all members of the institution by public announcement in the Press in a similar manner to that in which the medical profession sometimes black-lists public appointments offered at inadequate remuneration.

During the time that the tabulation of all appointments would necessarily take I would suggest that any surveyor getting to know of any job vacant or likely to be vacant should obtain early particulars and send them to the institution when the minimum salary in that particular instance could be quickly fixed and announced in the Press; at the same time a polite chit could be sent to the authority concerned stating this minimum salary for their guidance and "necessary action, please."

As chiefs would so get assistance from the institution, they in their turn would do all in their power to help assistants and deputies.

In conclusion, I hope that this letter will produce other and possibly better suggestions; anyhow, it is up to every surveyor to keep hammering away at this subject. There is no time like the present to bring about unity, fearlessness and fair remuneration for surveyors, and at the same time those long-delayed war bonuses should be strongly agitated for.—Yours, &c.,

LUX IN THE ARMY.

July 15, 1918.

Wages of Sewage Pump Drivers.—The Thurrock, Grays and Tilbury Joint Sewerage Board having received notice to leave from a pump driver, owing to the low wages paid (50s. a week), have decided to obtain a successor at £3 per week, this rate to apply to all drivers.

Firemen and Military Service.—It was stated in the House of Commons that instructions had been given to the regional directors of the Ministry of National Service to the effect that the National Service representatives were not to oppose before tribunals the exemption of part-time members of fire brigades, certified by the chief officer of the brigade to have satisfactorily performed fire brigade duty during the preceding twelve months and to be essential to the efficiency of the brigade, provided these men were in Grade 3 and over thirty-five years of age, or in Grade 2 and over forty-five. National service representations had also been instructed to give careful consideration to the cases of men of lower ages in these grades who were of special value to the brigade on account of their exceptional qualifications and long service.

Notes on Road Construction.*

By GEORGE GREEN, M.INST.C.E., Borough Engineer and Surveyor, Wolverhampton.

In acceding to the president's peremptory command to write a paper on road construction, the author feels that, in the first place, he is committing an act of trespass, as he proposes to deal with some bituminous carpet work made from the clinker obtained through the destruction of house refuse in Wolverhampton, similar work to that which has been carried out on a large scale in the borough of Hornsey by Mr. E. J. Lovegrove. He wishes very much that Mr. Lovegrove had written a paper on this subject himself; but, failing that, the author hopes that he will be able to be present and fill in many omissions and correct any discrepancies that may occur.

However, at the commencement the author must tender his thanks to him for the introduction to this material and method of construction, which is not only economical in the highest sense of the word, but is also sanitary and advantageous from many points of view.

The author became acquainted with this method of road construction, carpeting and repair when attending the Road Conference in 1915. Several members of the Wolverhampton Council saw the roads which were being made in Hornsey, and they were very anxious that the experiment should be tried in that town, and in 1916 this material was laid on a number of roads.

Before laying this material, careful surveys were made as to the character of road traffic using the roads proposed to be reconstructed, the gradients and contours of the roads, and the condition of the foundations.

The first road chosen for this purpose was the carriageway of Market-street, which is a short, narrow street in the centre of the town, and through which is passing continuously heavy railway and other traffic. There is a place of worship on one side of the road, also shops, business premises and two large breweries abutting thereon. It was therefore desirable to have a road-surface which would not only be clean and non-slippery, but would also be as quiet as possible. It is only fair to say that in the past this road has had such hard wear and tear that it seems difficult to know how to deal with it otherwise than by using granite or wood paving. During the author's experience of roads in Wolverhampton—for the past seventeen years—this road has always been a constant source of anxiety, and quite a number of experimental surfacings have been previously tried. Up to 1902 or 1903 it was a macadam road, made with broken granite, water-bound. In the winter this was a continual and wholesale manufactory for mud; it quickly wore into ruts and holes, and was looked upon as one of the worse roads. The common-sense way of treating the road would have been to have paved it with granite sets; this, however, was objected to locally, and therefore it was subjected to a series of experiments of various forms of tar-macadam which it is unnecessary now to tabulate.

When the Highways Construction Limited suggested bringing their machinery to Wolverhampton, and carrying out certain experiments which it seemed desirous they should do, this was one of the roads which was chosen as being the most in need of treatment in a thorough manner, and which would give this material the most severe test that could be found in the neighbourhood in the shortest period—especially as at that time it was in need of repair.

The road surface had worn down an inch or so below the proper level, and therefore it only required a little regulating in order to reduce it to the necessary state and depth below the surface to receive the new material.

It was decided that, owing to the character of the traffic, this must be "two-coat" work, with a finished carpet on the top. Perhaps it would be advisable to describe the method of laying this material—first the "two-coat" work and then the "carpet." After that the preparation of the materials for the manufacture of the clinker bituminous roadway covering will be described.

MARKET-STREET "TWO-COAT" WORK.

The area laid on this road is approximately 1,000 sq. yds. The width between the carriageways is 20 ft., and the foundation consisted of several inches of old tar-macadam on the top of the original old macadam road, which has been in existence for very many years.

Prior to laying the clinker Mexphalte—after the removal of any surplus material to a depth of 3 in. below the channels—the surface of the foundation was regulated where necessary by a scarifier, and where this was not possible by hand-picking, and swept perfectly clean. The surface as regulated was then carefully rolled and re-rolled. It is desirable, before the binder course of 2 in. is laid, that the road surface should be dry; but this is not absolutely necessary, and in the experiments in Wolverhampton unfortunately a very wet season was struck, and it was impossible on certain days to do any work at all, and on others the work was somewhat hindered by the rain.

When the binder course had been laid and regulated with rakes it was rolled slowly as it became cool, and, as soon as this had been sufficiently rolled and set, then the carpet—or top coat—which is 1 in. thick, was laid on the top. This was also raked very carefully over and consolidated by a steam roller—usually an 8-ton—the rollers of which are kept moist; but it should be rolled as hot as possible, in order to make it join up and become part of the binder coat, also to obtain maximum density. A very solid surface of 3 in. thick is eventually obtained, which has very much the appearance and density of rock asphalt. The only difference to an outside observer between the surface of this material and rock asphalt is that it is extraordinarily non-slippery. This seems to be entirely owing to the large percentage of dust destructor clinker, which is about 85 per cent. As soon as this is sufficiently rolled it is dusted over with some fine material, and traffic can be allowed to go on it in a few hours.

SINGLE COAT OR "CARPET" WORK.

A similar process is gone through in preparing the surface for the carpet work as for the two-coat work, except that the road does not require regulating to such a great depth—only the actual depth of the proposed new carpet is required to be taken off the old surface before the new is laid. Of course, as all are aware, there are sure to be hollows, pot-holes and trenches, and these have first of all to be dealt with and carefully regulated and filled up with suitable dry material, then finished with "binder" course to bring it up to the immediate surface whereon the "carpet" is laid. This surface has to be swept very clean, and then the "carpet" of 1¼ in. to 1½ in. is laid and rolled in a similar way to that in two-coat work to a finished thickness of 1¼ in. This process, however, is much more delicate than the former one and much more likely to go wrong unless it is very carefully treated, as the "carpet" is liable to roll in waves in front of the roller and under its pressure if too hot.

The only road for which the single coat was used was a road with a rather steep gradient, and this was laid in exceptionally bad weather towards the middle of October, and there was some difficulty in preventing this material becoming "wavy." It will readily be understood that a carpet of only 1¼ in. to 1½ in. thick will be liable to become "wavy" in the front of a roller, as it is rather important that rolling should take place when the material has become sufficiently cool for the purpose; if it is too hot it will spread out into too fine a carpet, and if it is too cold it is liable to break up.

The other streets treated with clinker Mexphalte were:—

(1) Union-street, a street similar to Market-street for description of traffic, width of carriageway and foundation. This road is subject to slow heavy railway traffic, &c.

(2) The margins of a paved granite tramway track on the main road to Dudley.—The area laid on this last road was 4,500 yds. sup., and the foundation the same as the former roads, being of water-bound macadam. This road is also subject to heavy traffic, and has a number of motor wagons and other vehicles of that type passing along it, drawing bricks from a brick yard to a munition works. The gradients of the road are quite satisfactory and comparatively level.

In a simple tabulated form below will be found a specification of the bitumen contents and analyses; also the temperatures, so that it may be seen at a glance how the materials are made up.

Two-coat work consisting of:—

BINDER 2 in. THICK.

Specification.	Average Analysis.
10 per cent bitumen.	9·2 per cent bitumen.
90 per cent destructor clinker.	90·8 per cent destructor clinker.
100 per cent	100 per cent

CARPET 1 in. THICK.

Specification.	Average Analysis.
15 per cent bitumen.	14·3 per cent bitumen.
85 per cent finely graded destructor clinker.	85·7 per cent clinker aggregate.
100 per cent	100 per cent

The thickness of the single coat carpet laid in Church-street was 1¼ in.

The temperatures aimed at for the binder material ex plant was 350 deg. F., the average temperature of this material as taken on the road throughout being 327 deg. F.

The temperatures for carpet work were 400 deg. to 450 deg.

* Paper presented at the annual meeting of the Institution of Municipal and County Engineers.

F. ex plant, average of this material as taken on the road throughout being 409 deg. F.

MIXING THE CLINKER AND MEXPHALTE.

A suitable place had to be found for the preparation, grinding and mixing of the clinker and the asphalt, and no better place could be found than the yard of the dust destructor. This, however, is some mile and a half away from the work, and an uphill road all the way to all the roads under reconstruction.

A large cart shed standing immediately opposite the destructor furnace was used for erecting the necessary machinery, lent to the corporation by the Highways Construction Company. This machinery consisted of:—(1) A large self-emptying mortar grinding mill and elevator; (2) A screen; (3) Several open hearth portable driers; (4) A mixer and elevator; (5) Heating boilers for Mexphalte; (6) Motor for driving grinding mill, elevators and mixers. This machinery was all run by a 30-h.p. electric motor, put down for the occasion, and connected up to the power station of the destructor.

The clinker was all wheeled in iron barrows across the open space between the destructor furnaces, where it is usually tipped, into the shed, and the grinding mill was then fed by hand from this supply. The clinker was generally hot, direct from the furnaces, and therefore did not require so much heating, and was almost dry. The whole process, in a permanently laid down plant, should be all under cover and conveyed by an overhead crane, or in buckets on a rope railway, and so be conveyed direct with the least possible handling into the grinder.

After being sufficiently ground, the clinker was elevated and passed through a screen, the very fine dust to be used for the carpeting being separated from the coarse material to be used for the "binder" or bottoms. These two materials are collected in twin bins for the respective uses.

It should be here mentioned that all the scrap iron and metal possible are first handpicked out of the clinker before putting it into the grinder.

The contents of the twin bins are then conveyed to the open earth driers, the fine dust to one and the coarse to another or according to the material at the time being mixed. After drying it is elevated to the mixing platform and placed in a heated mixing cylinder, where the proper proportion of Mexphalte is added; in this instance the hot Mexphalte was lifted in buckets handed up direct from the boiling pots. The mixer had a rotary arrangement, which caused the materials to become thoroughly mixed and incorporated.

It was then shot down from the platform into the carts and conveyed on to the roads under repair. The temperature in the cart was usually 350 deg. F., and when spread was not allowed to get below 330 deg. F.

The amount of clinker used is approximately 85 per cent and 15 per cent of Mexphalte.

The work was carried out to the specification of the Highways Construction Company and the author's requirements.

The machinery was portable and not of the latest type, and as all the fixing and general surroundings were of a temporary nature the most economic results could not be expected. The cost worked out at approximately 8s. 7d. per sup. yd. for the two-coat work, and 6s. for the single coat or carpet work.

The work has now been under traffic for nearly two years and has gone through two winters—one of which (1916-17) was of exceptional duration and severity; it has endured the test both of the traffic and the winters exceedingly well. Only the slightest repairs have had to be made adjoining manhole covers or other projections of that character.

The surface is highly sanitary, practically non-slippery, is admirable for motor traffic and durable. Time, of course, alone can say how long it will last and what the cost will be over a series of years, but the author is inclined to believe it will be economical.

Any saving to the corporation by the use of the clinker, which would otherwise have had to be carted to a tip or disposed of in some other way at a certain expense, has been neglected.

A good deal of inconvenience was caused to the workmen through the dust from the grinding of the clinker, owing to the building not being specially constructed for the purpose. The men were supplied with overalls and goggles, as there was generally a wind blowing during working hours and very considerable heat. No doubt in a properly constructed building special ventilation with fans would be provided, which would minimise the dust trouble; but in a temporary erection this was not possible. The dust was very fine and penetrating, and it was necessary to pay the men a considerably higher wage owing to the dust and character of the work; from a health point of view there is no doubt proper arrangements would have to be made for works of this character. Temporary, portable machinery erected in a temporary building not made for the purpose cannot be expected to be either perfect or economical.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Has not the council of the Association of Managers of Sewage Disposal Works acted very wisely in offering three premiums for essays on the disposal of sewage sludge in order to ascertain if possible the best practical methods employed by their members and to stimulate their interest in the subject? Could not the council of the Institution of Municipal and County Engineers follow this example and ask for essays on some practical municipal engineering problem instead of giving premiums, as is the present practice, for papers read at meetings?

* * * *

When will the acquisition and transfer of land required for rural and other municipal improvements and purposes be simplified? Is it not a scandal that when land is required for such purposes the landowners and the lawyers seem to vie with each other in running up the purchase price and legal costs in such a manner that a large number of most desirable public improvements have to be abandoned? Is it not to be hoped that when Parliament has the leisure they will be able to look into this matter and devise some scheme for lessening the difficulties and cost of land purchase for public improvements?

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Do the local authorities or the college trustees look after the roads in Dulwich? Are not some of them in a very bad state of repair, and do not many of them show signs of never having been properly constructed with good foundations which are essential on the dry soil which obtains in this district? What is the use of a bituminous surface if laid on an unstable foundation? Is it not certain soon to be full of waves and potholes? And do not some of the roads in this district show unmistakable signs of the lack of this provision?

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Has a brushwood sewage filter yet been tried in this country? If so, with what success? Is it not some years since an account was given in the pages of The Surveyor of such filters being tried successfully in America, and would it not be of considerable interest to many of us to know whether brushwood, which happens now to be very plentiful, can be used as an efficient substitute for clinker or other similar materials which are somewhat difficult to procure at the present time?

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Would not one of the solutions of the troublesome question of the congestion on our railways be the formation of Return Load Bureaus, which are now being constituted in the United States in order to meet this congestion? Is there not an exceedingly interesting article on this subject in *Good Roads* of May 4th, which describes the simple manner in which organisations of this kind have been started in America, and could not such an article be read with profit by the Government Departments in this country who are controlling transport? If it is a fact that at the present moment our railway trucks are only travelling loaded for about 2 per cent of the whole of their time, is it not evident that some effort should be made to render these vehicles more useful?

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Is it not well that a surveyor should sometimes go outside his daily routine work and enlighten us with local or other knowledge which is not strictly within his duties? Is not Mr. G. H. Jack, the able county surveyor of Herefordshire, to be congratulated on his presidential address to the Woolhope Club, on "Ancient Roads and Bridges," in which he gives a most interesting account of the history of roads, and numerous details of ancient roads and bridges in his own county? Was not Mr. Jack quite right when he referred to the lines "The old order changeth, giving place to new" and expressed his regret that industrial progress and artistic tastes appeared to be divorced, as was shown by the necessity for replacing some of our picturesque old bridges by those which could stand up against modern burdens? Do we not share in these regrets and sometimes wonder if so-called modern progress and *kultur* are the only things in this life for which we should struggle?

Fuel Order Critics.—The Household and Lighting Order, 1918, was strongly attacked at Salford Town Council recently by Alderman Phillips (Gas Committee chairman), who described it as a complex and far-reaching Order which would disturb all the household and business premises of the country. A more sensible procedure, he said, was the suggestion offered to the Coal Controller by the Salford Coal Supplies Committee—that all consumers of coal, gas, and electricity should be required to reduce their consumption by a definite percentage. The Parliamentary Committee will consider the question with a view to a protest being made to the authorities.

Institution of Municipal and County Engineers.

THE ANNUAL MEETING: ROADS CONFERENCE DISCUSSIONS.

The first papers discussed at the Roads Conference held in connection with the recent annual meeting of the Institution of Municipal and County Engineers were as follow: "Some Random Notes on Roads and Traffic," by Mr. A. Dryland, county surveyor of Surrey, and "Further Notes on Road Construction," by Mr. G. Green, borough engineer of Wolverhampton. The first of these contributions appeared last week, and the second is reproduced in the present issue.

DISCUSSION OF MESSRS. DRYLAND AND GREEN'S PAPERS.

Mr. W. H. GRIEVES (Sutton, Surrey) said that Mr. Dryland's formula W.B.M.G. (Water Bound Must Go) was one that could not be doubted for a moment. He had seen roads which he had to pass over in connection with some military duties he had undertaken repaired with water-bound macadam, and within a fortnight they had been absolutely in potholes. In a week or two they had been again repaired by the same process. He knew a water-bound macadam road which it was absolutely impossible to drive over with any degree of comfort. Talk of potholes, it was worse than that; it had got to shell-holes by this. That was on account of the heavy traffic which went regularly over those roads, and he knew that the local authority in question had had to set aside a very heavy sum of money to be spent on that road. If they could encourage a good deal of the traffic of the future to go through the air instead of over the roads they would be saved much of the trouble in store for them. Mr. Dryland had called attention to the fact in connection with trenches cut in the road that the effects of subsidence were much more marked on waterproof surfaces. Only the other day he repaired a road with Tarmac, and within less than a week the water company had that road up. It looked as if they would have to go in for culverts, which would carry all sorts of pipes and cables for gas, electricity, water and sewage, so that the surface of the roads would not have to be disturbed. Mr. Dryland said that his records disclosed among other things, both favourable and unfavourable, the fact that slag tar-macadam coatings laid in 1905 were in existence to-day, and other lengths from 1907-8-9-10 and 11. He fancied that one of the lengths Mr. Dryland had in his mind was in the Sutton district. It was quite true that on some of the main roads in his district, where the heaviest traffic was experienced, the tar-macadam was laid as long ago as the date given, and stood well to-day. They had done scarcely any repairs to it during the last seven years. As regarded road widenings and improvements, an important matter was the practice of retaining short strips of land to make money out of the public. It was an iniquity where there was a narrow strip, say, of 6 in. on a road 40 ft. wide, that the local authority should be held up and their access prevented that the owner might blackmail the authority to purchase the land. They had had two or three such cases in his district, and it would be wise to get rid of them. The council of the institution should take up Mr. Dryland's suggestion as to defining the building line, and the county council of a county or borough should be made the authority for fixing that line. There should, however, be some consideration given to an urban district of 20,000 or 25,000 population.

Mr. J. ANDREWS (Dumbarton) said he thought that careful records should be kept of the life of all roads and of the amount spent on their repair and maintenance. There should also be statistics kept of the traffic on the roads.

Mr. J. A. BRODIE (Liverpool) said he was glad to see that Mr. Dryland said that water-bound macadam was out of date. Some of them had been struggling for many years to have that position accepted. There could be no doubt that very large amounts of money had been spent on water-bound macadam roads during the past ten years which would have been very much better and more efficiently spent on work of a more permanent character. He was a very strong believer in getting as much permanent work done as possible in connection with roads. His own experience showed that if they put money into roads in the nature of permanent works they saved more and more money each year as the time went on, and they had more and more money available for the improvement and maintenance of road surfaces. He was sorry that some of the papers had not touched on the question of concrete for roads. Liverpool experience showed that there was nothing in the world which paid them better under road surfaces. Concrete was a cheap material. It was a material which was practically available all over the country, and their experience showed that if they put down a concrete foundation they got a more perfect surface in that way than they could get in any other, and their wearing surface—even if they did not take the American system of laying the concrete for wear—could be a very thin surface of some elastic material. His own experience in the last five or six years led him to favour very much the construction of concrete foundations in roads where the traffic was at all considerable in extent. He would like to say in regard to Mr. Dryland's paper that his point with regard to the acquirement of land was one which was a real disgrace to them as engineers, and possibly to their friends at the Road Board, because their method of handling the acquirement of land in connection with the roads was, in his opinion, very feeble. In Liverpool they had special powers in which they got in new roads all land free up to 80 ft. in width, and they were able to purchase all additional land which they desired at the average value of the estate, whatever that might be, which brought them back very much to the position which Mr. Dryland desired, that the land should be acquired at a cost equal to the actual loss of value to the estate. As to the use of destructor clinker for roads dealt with in Mr. Green's paper, the municipalities had in destructor clinker a most valuable material. He had used it for twelve years in connection with pitch and tar, and it formed a most valuable road surface. It had this little drawback—that with pitch and tar they required a great deal of accurate knowledge of the material wherewith they were dealing, and that knowledge was not always available. He was a little disappointed with the cost of Mr. Green's works. He was rather surprised that for a surface of that description the cost ran up to 8s. 7d. per super. yard for the two-coat work. Much road construction material had been brought from abroad. They should, as far as possible, use material which was available in this country. He was a little disappointed, too, that Mr. Green had omitted a most valuable feature as to road surfaces—that was the cost over a number of years. It was no good telling them, unless they were told pretty accurately, what the cost was to-day; they should know what the cost was every year for a number of years past, because that enabled them to gauge the value of the newer surfaces. He would also like to have some accurate information on the question of the traffic which those surfaces were called upon to withstand. Without information as to the weight and the number of vehicles, or some fairly accurate knowledge of the traffic using the roads, they could not get an accurate idea of the value of the different kinds of road surfaces.

Mr. H. E. STILGOE (Birmingham) said he did not think there would be any difference of opinion as to the necessity of having greater power in the matter of acquiring land for the widening of existing highways. Some towns, as they knew, already had their special powers by which they could prescribe frontage lines, and in that way prevent the bringing forward of buildings beyond a certain distance from the centre line of the street in conformity with the line which might be prescribed. But all that was confined to a few towns which had these special powers. There ought to be some general power given to local authorities to prescribe the frontage lines within a certain number of feet from the centre of the road, taking a different width for arterial roads, secondary roads, and roads of the third class. The whole subject was a very big one, and he did not know that they could usefully enlarge upon it, but they would have to keep hammering away on every occasion, so that in time they would get men in the position of Sir George Gibb, and others in equal authority, to enforce their views upon the Government. Mr. Dryland had referred to the effects of the subsidence of a trench being much more apparent in the case of waterproof surfaces. Personally he did not accept the view expressed in the paper, but thought that in a road with a tarred or similar surface one would observe the crack much more readily. In an ordinary water-bound road the surface of the trench would keep settling down, but one did not notice that to any extent. He could give them instances which would prove that the question of whether the roads were water-bound had nothing to do with the settling down of the trench at all—that was to say, from the constructive point of view. He had occasion three or four years ago to strip off a concrete bed and wood paving from a road, and there they came across an old sewer trench, which no doubt had been filled in more or less properly twenty years previously. When the concrete had been stripped off, in the course of a fortnight they had some heavy rain, and the whole thing suddenly went down 3 ft. The elements had been kept from the subsoil by the surface and paving, and this had had the effect of leaving the soil in its ordinary position. In regard to Mr. Green's paper, one of the most interesting claims was that of economy in using destructor clinker. In Birmingham they constructed a clinker-made road twelve months ago. The work had stood very well, but it was very costly. The chief cause was the high price of Mexican asphalt, which to-day was £12 per ton, whereas in ordinary times it was less than £4 per ton. The other was the great cost of labour. At Hornsey the work came out at 4s. per super. yard; in Mr. Green's case it came out at 8s. 7d. per yard; and

in their case at Birmingham it was 8s. 6d. per yard for the contractors' part of the work, and in addition there was the cost of the foundation, which was very heavy. But there were special circumstances, one being the great distance of the haul. One must not be discouraged by these high prices, and he hoped they would not, because when they came to normal conditions they ought to make use of destructor clinker or any other waste material which could be put to proper use. To-day they were short of roadstone, but his opinion was that the Roadstone Committee were giving the local authorities all the roadstone they were in a position to lay, and that there was not sufficient labour in the country to lay more stone if they had it. After the war they should go in for other than water-bound macadam and reduce that to a minimum. They should expend their energy in finding better cementing materials, and should adopt waste products such as destructor clinker, and he hoped they might be able to find something cheaper to bind them with. Mexphalte even at £4 per ton was expensive enough, and he hoped they would be able to find something at home or abroad to give them surfaces which would be lasting and save them expensive upkeep. He could give them an instance of how by adopting tar-macadam on a road which for many years had been laid with water-bound macadam they had been able even in these times to effect a great saving. When he told them that this road carried 200 tons per 16 yds. of width every day and had stood up well they would see how great an economy it was to use a material of that kind. It was no use putting down such material save on a good foundation. That was the first principle in road construction.

Mr. A. J. Price (Lytham) said there were two points he would like to speak upon. The first was as to wave action, which was probably the most important point in Mr. Dryland's paper, the second the use of destructor clinker as a cheap material which gave satisfactory results. Wave action they found practically on roads of all description, on asphalt roads, whether laid on a good foundation or in a thin coat on a wretched foundation. The weight and speed of the vehicles using the roads had a good deal to do with that. As to wave action on ordinary macadam and tar-macadam, he thought it was generally admitted that the wave action on ordinary macadam was very much less than on tar-macadam, and this was due to the elasticity of the latter. What they wanted to get at was: What led to this elasticity? Tar-macadam could be made practically as good as ordinary asphalt. There were lots of roads constructed of tar slag and tar granite which were doing as satisfactory work as asphalt roads. The fault was that many of the tar-macadam roads were not of a proper constituency—there was too much tar mixed with the stone. His experience had led him to prefer a hand-picked rubble foundation so that the tar would go down instead of coming up. In patching a road or putting a new surface on a footpath he had been in the habit of picking holes in the hard foundation. Wherever those roads had been picked they could see little white spots on the surface, which showed that the tar had been able to work its way into the holes rather than appear on the surface. Therefore he preferred a hand-picked foundation sufficiently open to allow the tar to sink into it. He had noticed on one of the principal roads in his district where he had been able to put in a hand-picked rubble foundation with about 4 in. of tar-macadam on the top there was no wave action on the surface of the road. Where he had had an old tarred road and put a thin surface on the top then he had found wave action taking place. Then with regard to tarred clinker macadam, about two years ago he got his council to widen a road from 30 ft. to 60 ft. as building was about to take place. He suggested that the road should be made up with tarred clinker. He put that tarred clinker down practically as a makeshift to a depth of 6 in. in places, in others 3 in. or 4 in., and in some 2 in., blended it with ¼-in. granite chippings, and after two years' wear he had been very much surprised at the way it had stood up to the traffic. It was the road which carried the most and heaviest traffic in the district, munition works and shipyards, and it carried the traffic very well indeed. He thought they would have to use destructor clinker for bottom coats even if they had to face it up with something harder. Labour was going to be a very serious item for all of them.

Mr. J. W. Cockrill (Great Yarmouth) said he knew a little about concrete, and was beginning to learn something about tar. He had roughly 150 miles of roads and streets. In pre-war times they spent £3,200 a year for cleansing and small repairs; and he was allowed £4,000 a year for road-making—tar-macadam or water-bound macadam. Tar-macadam predominated because water-bound macadam was a most expensive form of roadmaking. The war had shut off money from his department; in fact, he had been told to spend nothing. He got about £1,800 a year for street work; the Road Board had helped to the extent of £300 a year, which had reduced the nett cost to £1,500. He had had no money for the remaking of roads. Consequently a sum of £2,500 a year had been saved to the council. The result was that he had roads in better condition than before the war, although traffic had been increased. That was how the matter stood. Then he had had a little experience in the making of concrete roads. Ten years ago he made some narrow concrete roads between the rows. There was a heavy traffic—haulage of coal and other things passing over those back roads, and they were standing very well. Tar was a cure for a good many of the ills that roads were heir to, and it would go a long way to remove their difficulties. He had a very good material in the shingle from the beach. Some time ago when he was hard up for shingle he mixed it with destructor clinker, carefully breaking the clinker. He recently had occasion to make some alterations and break up that shingle and concrete, and he then found it the toughest concrete he had ever met with.

Mr. E. J. Lovegrove (Hornsey) wrote stating that he desired to express his appreciation of the excellent and concise paper which had been submitted by Mr. Green, and to support the views expressed with regard to the drawback attendant upon the use of portable machinery and the resultant inflated cost of the work where only comparatively small areas were undertaken. The carrying out of this class of work in the Hornsey district had from its inception been dealt with by the council's own staff, except a man in charge of the hired plant; but the town council were somewhat favourably placed, having existing machinery for preparing clinker for manufacturing footway-paving slabs, and this machinery had been used during the summer months for carriageway work. The only additional plant therefore required had been the open-hearth driers and mixer, which were hired from Highways Construction, Limited. With regard to the single as compared with the double coat work, some of the earlier sections were laid down in single coat, but it had been found that if the traffic was sufficient to warrant a bituminous surfacing of this class it was better to lay a double-coat work, even if the bottom coat formed only a shallow protecting coat between the old road surface and the underside of the top fine coat. The coarse bottom coat acted as a binder, or non-slip layer, between the roughened road surface and the fine top coat material, which otherwise had a tendency, under the action of the traffic, to slip or be damaged through inequality of compression. The different classes of clinker could be readily and successfully dealt with by varying the method of preparation. The best grading with the Hornsey material had been produced by the joint use of a mill and pulveriser. With regard to cost, the highest pre-war price in Hornsey was 4s. 1d. per yd. sup., no charge being made for the clinker, the whole daily output of which was used while the work was in progress, the surplus being drawn from a reserve winter stock. The work had been continued each year, and, notwithstanding prevailing prices, the highest cost for double coat had not exceeded the above figure by more than 50 per cent. Considerable areas which had been subject to heavy traffic, including double-decked motor 'buses, had already passed through four winters, and, where undisturbed by service openings, had required no repair. Mr. Green had referred to the material as being extraordinarily non-slippery and of the density of rock asphalt. This was largely due to its peculiar composite character. In an article on "Aggregates and Fillers for Bituminous Road Construction," published in The Surveyor of October 22, 1915, he pointed out the natural way in which destructor clinker was graded so as to form a perfect aggregate, providing its own filler, and how, in order to obtain such high results from natural material, such as sands, it would be necessary to blend several classes of material with a filler. The maximum gradient upon which double-coat work had at present been laid was 1 in 24. On a gradient of 1 in 14 another class of clinker aggregate had been used, the principle adopted in the grading being entirely reversed. The section of road in question was a motor-'bus route and had successfully passed through two winters without repair or surface treatment. Areas of single-coat fine material had also been laid on existing concrete foundation, replacing the old rock asphalt, and wood paving in tramway tracks had been replaced by double-coat work, the material being laid close up to the tramway rails. Clinker bituminous grouted macadam had also been laid on gradients up to 1 in 15. The grout was made entirely of clinker and bitumen in block form, was unaffected in storage or carriage by heat, and when placed in the boilers on the roadside was quickly ready for use, still holding in perfect suspension the clinker particles, thus producing a grouting material the texture of which, in wear-resisting quality, approximated to that of the broken rock. The cost per yd. sup.—the rock used being a quartz porphyrite—was about the same as double-coat clinker-asphalt work. Speaking generally, the destructor clinker heap provided all that was required for foundation and aggregate for a first-class road; freed from tins, metal and scrap, it was an excellent hardcore. The clinker bound well and acted as a shock absorber, thus reducing to a minimum the wave effect of wheel traffic. A road which for about a quarter of a mile was only 18 ft. in width, carrying

upwards of 700 tons per yd. width, including motor 'buses, formed with double-coat bituminous work on 12 in. of clinker foundation, had been laid for five and a-half years, and showed no sign of movement or wave. A short experimental section of similar work was laid in a road where the traffic was close upon 1,000 tons per yd. width, in between lengths of armoured concrete foundations and wood-block paving, and after three winters still held its level, the surface being flush with the adjoining work and tram lines, although in this case the clinker foundation could only be hand-rolled and punned. Existing concrete foundations should undoubtedly be used, but for new work he had every confidence that destructor clinker foundation, with double-coat bituminous work, would successfully meet the requirements of heavy traffic. The clinker bituminous grout above mentioned had also been used in a different form for painting the road surface, holding up through the winter under conditions where tar-painting would have disappeared early in the autumn This was naturally more costly than tar, but if a slightly increased expenditure produced weather-resisting material the successive treatments would be cumulative and economical.

The vote of thanks was passed, and the authors of the two papers replied.

Mr. Dryland, dealing with what had been said by Mr. Andrews, observed that records might be amplified to any extent, and he was hoping, with better times, to improve his a great deal. He hoped to keep separate records of the cost of different lengths of road over a number of years, giving the first cost and then the cost of repairs and maintenance. Such a record would be very valuable, particularly if one also had the record of the volume of traffic and other facts concerning the roads. He had looked up the figures of cost of one of his tar-macadam roads. It cost 3s. 9d. per yard in 1905, and the maintenance cost in thirteen years had been 3s. 1¾d., which worked out for the thirteen years—and the road still had considerable life in it—at 6s. 10¾d. This was equal to 6½d. per year as compared with 7½d. per yard per year for four years for water-bound macadam. That was fair evidence that water-bound macadam was not a cheap road in certain circumstances of traffic. He should like to have heard more about wave action. He knew certain people thought it was simply the foundation which was responsible for it, but he was sure it was not so, because it appeared on roads which had sound foundations. He did not agree with Mr. Price that it was greater on tar than on water-bound macadam. He was glad to hear that Mr. Cockrill's roads were better than before the war. He was afraid he could not emulate that, but the roads which he dealt with before the war had stood the traffic very well, and the deterioration was less than it might have been.

Mr. Green, replying to Mr. Brodie as to the cost of his roads, said it was purely a question of war prices, both as to material and labour. Mr. Stilgoe had practically answered Mr. Brodie's question as to cost. If a cheaper mixture could be found to use with the clinker they would be able to get to the bottom of one of their difficulties. He should like to emulate Mr. Cockrill. It seemed to him if Mr. Cockrill's council gave him nothing next year his roads would be perfect.

(To be concluded.)

THE STRETFORD MEETING.

We are obliged, owing to pressure on our space, to hold over until next week the report of the meeting of the Institution of Municipal and County Engineers held on Saturday last at Stretford.

RECENT PUBLICATIONS.*

Rural Water Supplies and their Purification. By Alexander Cruikshank Houston, M.B., D.Sc., F.R.S. (Ed.), Director of Water Examination, Metropolitan Water Board. Price 7s. 6d. nett. London: John Bale, Sons, and Danielsson, Ltd.

Dr. Houston's object is to give information to a large class of persons interested in the purification of small non-public water supplies in rural districts. He addresses not only the expert and the engineer whose knowledge is rusty, but also "those who by their capabilities and training (not necessarily technical) are admirably qualified, prospectively, if not immediately, to help themselves, and others, as regards the safety of water supplies"—in short, the amateur engineers.

The book is altogether excellent. It shows very clearly how any sort of small water supply can be purified absolutely and economically. The purification and sterilisation of rain water, supplies from wells, springs, rivers, brooks and lakes are dealt with, and the subject is illustrated by means of the results of a large number of actual experiments, while the simple apparatus required for the treatment of a small water supply is described, and a final section of the book gives a considerable amount of miscellaneous information which will be of assistance to the non-expert reader. The author has stated in his preface that the expert will, perhaps, find little in these pages by way of instruction, but in this he does not do justice to himself or to the book, for there is no expert who in reading the book will fail to find matter of very great interest, even if it is mostly the confirmation of opinions formed but not held as strongly as might be; and, further, Dr. Houston's experience as a bacteriologist and epidemiologist being unique, his present writing settles with finality more than one doubtful point.

The appeal to the amateur engineers above referred to is worded so carefully that more than one construction may be put upon the sentence. That they will read this book and that it may be the means of enabling them to help themselves and others, "as regards the safety of water supplies," is devoutly to be wished; but heaven forbid that they should actually start trying personally to sterilise water, which involves doing the work of chemist, bacteriologist and engineer all at once! There is great danger in tempting the amateur in this manner. No water engineer should attempt to sterilise water for drinking purposes without the advice of a chemist and bacteriologist skilled in such matters; far less should an amateur. Any really intelligent man reading this book will at once grasp the fact that expert advice is essential whenever water purification has to be dealt with. Dr. Houston's complaint that inventors have failed to bring forward satisfactory appliances for the sterilisation of water for household purposes is not altogether justified, and appears to show some lack of knowledge of the engineering side of the question, as do his descriptions of apparatus. In this respect it is certain that closer co-operation between the chemist and engineer is essential if the best results are to be procured, and this applies equally to small or large works.

* Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

CORROSION OF IRONWORK.

PAINT AS A MEANS OF PROTECTION.

In a paper read before the Iron and Steel Institute, Mr. J. N. Friend summarised as follows the results of his researches on the usefulness of paint for protecting ironwork from atmospheric corrosion:—

(1) The practical value of acceleration tests is very small in the present state of our knowledge. Reliable results can only be obtained from tests carried out under conditions closely resembling those prevailing in practice.

(2) Addition of pigment to oil increases the efficiency of the latter as a protective paint until a maximum is reached. After this, further addition of pigment causes deterioration. The best results are obtainable from paints possessing as high a percentage of good oil as is compatible with good body and any other working property that has to be considered.

(3) Linseed oil on setting expands by some 3·3 per cent. This is the primary cause of crinkling. Further oxidation causes a decrease in volume, which in time leads to cracking.

(4) Linoxyn is permeable to moisture. The permeability is reduced by heating in absence of air, the oil increasing in density, viscosity, and molecular weight.

(5) Polymerised linseed oil affords a better protection than raw oil when used as a paint vehicle.

(6) The functions of a pigment are to toughen the film and render it less permeable to water-vapour and oxygen. It also reduces the expansion of the oil on setting, and thus minimises the tendency to crinkle.

(7) A thick coat of paint protects the underlying metal more efficiently than a thin coat, provided the coat is not so thick that running or crinkling takes place.

(8) The very best results are obtained by multiple coats. Two thin coats are better than one thick one of equal weight.

(9) Thinners enable thin coats of paint to be applied. Turpentine leaves a very slight residue behind upon evaporation, but its effect on the efficiency of the paint is small.

(10) Other things being equal, the most permanent paints are those containing black or red pigments, since these absorb the shorter rays of light, and prevent them from hastening the destructive oxidation of the linoxyn by the air.

(11) Finer pigments afford more efficient protection than coarse pigments, since they are more thoroughly in contact with the oil.

(12) Iron structures should be painted whilst their scale is still on, after loosely adherent flakes and rust have been scraped off. The paint will last rather longer than if applied to the pickled or sand-blasted surface, and the labour of removing the scale is saved.

(13) Experiments with rusty plates are not conclusive, but suggest that the rust need not be so carefully removed, prior to painting, as is usually thought to be necessary.

ROAD REINSTATEMENT AFTER THE WAR.

By W. Rees Jeffreys,
Secretary of the Road Board.*

Is it possible to propose a practicable scheme to:—(*a*) Reconstruct and improve some of the principal roads in Great Britain, (*b*) Construct new roads required in connection with town planning and housing schemes; and (*c*) Provide employment for discharged soldiers and munition workers between the period of demobilisation and their re-employment in civil life?

If the war lasts through 1918 the sum required to make good the deterioration and bring the roads back to the pre-war standard will probably not be less than the equivalent of two years' expenditure upon the roads, say £30,000,000, over and above the ordinary expenditure of the first peace year. If the war lasts through 1919 the expenditure to make good deferred maintenance will be proportionately much higher. Deterioration is progressive.

The roads of England and Wales are vested in nearly 2,000 local authorities. A continuous length of 20 miles of important road may be in the hands of three, four, or even as many as ten independent authorities. Their organisation and financial resources, generally speaking, are unequal to any general scheme of improvement. It may be necessary, therefore, to provide from some central source both the money and the organisation to deal with special work.

Under Brigadier-General Maybury there has been established in France a successful organisation for constructing and repairing roads, which is officered by some of the most capable engineers, road foremen and road workmen of Great Britain. A road organisation has also been established in England by the Road Board for dealing with work on private and public roads required by the War Office, the Ministry of Munitions, the Admiralty and the Board of Trade. Both the French and English organisations have acquired plant for the purposes of their work.

PROPOSALS.

That the classification of roads into three classes be completed, and the scheme recommended by the Treasury Departmental Committee on Taxation and embodied in the then Government's Finance Bill (251 of 1914) be carried into law. This scheme provided for a Government grant to highway authorities of 50 per cent of the cost of maintaining first-class roads and 25 per cent of the cost of second-class roads.

That sufficient of the War Road Organisation which has been created in France and England be formed into a temporary organisation on a civil and voluntary basis to assist the local authorities in the work of reconstructing the 15,000 miles of road and the several hundred weak bridges, and any other special works, such as new roads required in connection with housing schemes and industrial developments. The highway authorities with their ordinary staffs to deal with (1) current maintenance and (2) making good deferred maintenance.

That the Temporary Road Organisation, with its backbone of municipal engineers, foremen and skilled roadmen shall be utilised to give useful and distributed employment to many thousands of soldiers and munition workers in the intervening period between the time that they are no longer required as soldiers and munition workers and the time that they are absorbed in civil employment.

That the Temporary Road Organisation continue to use its roads and quarrying plant required during the war and as many thousands of ex-military lorries as it usefully can employ.

That the Temporary Road Organisation shall undertake the distribution of road materials not only for the reconstruction of the 15,000 miles of road on which it is specially employed, but for all the highway authorities in England and Wales which desire its assistance.

A five-year programme for the Temporary Organisation to be settled, involving a total expenditure of, say, £54,000,000. The work might be spread over five years as follows:—In the first year, 20 millions; in the second year, 13¼ millions; in the third year, 9¼ millions; in the fourth year, 6¼ millions; and in the fifth year, 5¼ millions; the Temporary Road Organisation being gradually reduced each year as its work is completed. At the end of the fifth year it could be disbanded, having placed the local authorities in possession of 15,000 miles of reconstructed roads and several hundred strengthened bridges.

The 15,000 miles of road to be reconstructed would be settled by conferences between the Temporary Road Organisation and the local authorities, and the order in which particular lengths shall be dealt with determined by the order of their importance. When the reconstruction of a particular length has been completed by the Temporary Organisation, the local authority would be responsible for its future maintenance.

* From a paper entitled "Some Administrative Problems," presented at the annual meeting of the Town Planning Institute.

The special works of road reconstruction, new bridges and new roads will be undertaken by the Temporary Road Organisation in such a way as not to interfere with the road organisations of the local authorities, which would carry out their ordinary programme of repairs and renewals with their own staffs in the ordinary way, save that they would have the assistance of the Temporary Road Organisation in the matter of supplies.

FINANCE.

On the assumption that peace is declared at the beginning of 1919,* the financial position as it will exist in 1919-20 will be as follows:—

One year's expenditure on maintenance, ordinary improvements and loan charges, as in 1914-15	£16,684,000
Add 20 per cent for increased cost of labour and material	3,336,800
	20,020,800
Add deferred maintenance, 1915-19	30,000,000
Total expenditure to be provided to restore roads to pre-war conditions	£50,120,800
Deduct amount which some authorities have accumulated and invested in Treasury Bills, &c., as a sum to be used in making good the roads after the war, say, as a guess	7,000,000
Money to be found	£43,120,800

Suppose that the above be found by the local authorities with the assistance of short loans so that the total annual expenditure for which the local authorities will be responsible will for the five years immediately following the war average not more than £24,000,000. This it is assumed will be the maximum burden that the local authorities will carry, even if they will carry so much. The sum which will need to be found from other sources† will be:—

(*a*) Cost of reconstruction of 15,000 miles of road, including 2,000 for motor-'bus traffic	£33,000,000
(*b*) Cost of reconstruction and improvement of bridges	7,000,000
(*c*) New roads, bridges, and improvements in connection with housing and town-planning schemes	An indefinite amount.

No estimate is made for costly urban widenings involving the purchase of buildings, as it is assumed that all such improvements must for financial reasons be postponed for many years.

NOTES AS TO SCOTLAND.

Expenditure on maintenance and improvement, including loan charges in 1914-15 (24,908 miles)	£1,484,147
Estimated mileage of important roads needing reconstruction—2,000 at £1,500 per mile ...	3,000,000
Deferred maintenance—not nearly so great as in England, owing to much better local supplies of stone—which in Scotland is not controlled—probably does not exceed	150,000

* The longer peace is deferred the greater will be the cost of making good deferred maintenance—say, £40,000,000 in 1920, £55,000,000 in 1921, £75,000,000 in 1922. Every year will add increasingly to the difficulties of arranging the finance of the roads after the war.

† Having assumed that the capital sums required for reconstruction and new construction cannot be raised by means of local rates, I refrain from suggesting other sources of revenue on this occasion. They should obviously be discussed, in the first place with the interests which may be asked to provide the money.

LOCAL GOVERNMENT BOARD INQUIRIES.

The Editor invites the co-operation of Surveyor *readers with a view to making the informaton given under this head as complete and accurate as possible.*

APPLICATION FOR LOAN.

Walsall T.C.—£6,304 for the electricity undertaking.

LOANS SANCTIONED.

Padiham U.D.C.—£3,000 for vertical retorts at the gasworks.

Poplar B.C.—£16,696 for electricity purposes.

Weybridge Promenade Scheme.—The Thames Conservancy and the local council are co-operating in a proposed scheme for the construction of a riverside promenade at Weybridge.

Derby Town Planning.—A Local Government Board inquiry which was held at Derby on Friday last evoked considerable opposition from the authorities of the areas outside the borough which are affected. The area embraced by the scheme comprises 7,239 acres, of which 2,031 are in the borough, 1,333 in Belper, 132 in Repton and 2,813 in Shardlow rural districts, and the remaining 930 acres in the Alvaston urban district.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week. Other reports will be found on our "Local Government Board Inquiries" page.

BUILDINGS.

Brighton T.C.—The Health Committee recommend that steps be taken forthwith for the extension of the public abattoir.

Norfolk C.C.—The council have approved a report of the Public Health and Maternity and Child Welfare Committee, suggesting a scheme for the provision of isolation hospital accommodation.

ROADS AND MATERIALS.

Argyllshire C.C.—As regards the Kinlochlevan road, the road surveyor, Mr. Kenneth Macrae, reported to the Lorn District Committee that the Road Board had agreed to the carrying out of the work being placed under his direct control. The board had also agreed to take over the obligations contained in the agreements with Lady Strathcona and the British Aluminium Company, and to limit the county council's contribution to the sum originally proposed. Prisoners of war were now employed on the road to the number of about 350 and a portion of the Invercoe end had been let to a contractor, with a stipulation that he was to utilise all available local labour.

Bingley U.D.C.—It is proposed to effect an improvement of the main road at Crossflats for the purpose of tramway and general traffic, and for this and other purposes the council have decided to purchase property at a cost of over £7,000.

Blore Heath R.D.C.—The council have received an assurance that the Government will be responsible for the cost of repairs to the roads as from March 1st last, and for future repairs whilst the timber hauling continues.

Carnarvonshire C.C.—The council have confirmed the recommendation of the surveyor's committee, in view of the shortage of men on the land, that all main road work should be suspended for four months, and that the engagement of all roadmen be terminated, the hope being expressed that all such men should seek employment with farmers.

Cleethorpes U.D.C.—The council are recommended to purchase property at the corner of Cambridge-street and Yarra-road, for a street improvement, at a cost of £360.

Down C.C.—The county surveyor, in his report dealing with the state of the roads, said that in May, 1914, he had informed the council that in the last ten years, for which returns were then available, Antrim, a county with a smaller population, valuation, and road mileage, had spent on its roads £104,217 more than Down, or an average of more than £10,000 a year. In the last three years, for which statistics were now available, Antrim spent a total of £8,430 more than Down. Last August he estimated that a reasonable annual expenditure for the maintenance and possible gradual improvement of the roads would be £138,857, as against £51,014, the average for the three years before the passing of the Local Government Act. Since August prices and wages had further advanced, and if they were maintained at their present high level this large amount would not be nearly sufficient. The council have decided to consider the matter later.

Linlithgowshire C.C.—The Linlithgow District Committee have decided, in view of the fact that no agreement has been reached with the Edinburgh Town Council with reference to road maintenance in respect of the city council's proposed tramway to Queen's Ferry, to oppose the tramway scheme.

Northants C.C.—The Roads and Bridges Committee made a claim for £1,000 for damage due to extraordinary damage to the Kettering—Stamford road between Easton-on-the-Hill and Wothorpe. The Roads Board, in reply, offered to recommend the Air Ministry to pay half the estimated cost (£4,600), strengthening and resurfacing 2 miles 650 yds. of the road, including the damaged length. The committee recommended that the county council undertake the work providing that the £1,000 claim for damage already done be recognised and £2,400 of the remaining £3,600 be contributed by the Air Ministry.

Spilsby R.D.C.—It was reported that the Highways Committee of the county council had made application to the Road Stone Control Committee for the use of 500 tons of material on the roads of the rural district this summer.

Stoke Newington B.C.—The Highways Committee recommend the resurfacing of the carriageway at Amhurst Park, at an estimated cost of £1,600.

Uckfield R.D.C.—The surveyor, Mr. E. Johnson, has forwarded to the Road Board an estimate of £3,667 for the repair of the Sheep Plain, Hurtis-Hill and Walashes roads, Crowborough.

SEWERAGE AND SEWAGE DISPOSAL.

Bolsover U.D.C.—The council have accepted a tender at £295 for the construction of a sewer at Shuttlewood, and have also completed arrangements for relaying the sewer in New-street. Application is to be made to the military authorities for the use of German prisoners for work at the sewage beds.

Conway R.D.C.—The council are seeking to ascertain particulars of cost of a sewage disposal plant suitable for the proposed scheme at Dolgarrog.

Reigate R.D.C.—The council have accepted the estimate of Messrs. F. Bird & Company for a cesspool-emptying apparatus at £530, subject to the machine being delivered in a reasonable time.

WATER, GAS, AND ELECTRICITY.

Birmingham T.C.—The Electric Supply Committee have approved a scheme for the extension of the generating station at Nechells, the erection of a new permanent station having at length been agreed to by the Board of Trade. If the whole scheme is accepted by the city council it will involve the expenditure of more than a million of money, spread over a long period.

Bury St. Edmunds T.C.—An extension of the electricity mains to the Fornham-road district has been agreed to, at an estimated cost of £625.

Denby U.D.C.—The council are considering a suggestion of the surveyor, Mr. T. Shield, for the installation of a scheme for improving the distribution of the water supply by gravitation.

Driffield R.D.C.—The Sanitary Committee have been authorised to consider the question of an improved water supply in the Dale towns. The method of drawing water in these places was referred to as being of a primitive kind, a rope and bucket being used by the inhabitants of Butterwick, the well machinery being out of order. It was stated that as a result of these operations a quantity of buckets had fallen into the well, and people were tired of "fishing" for them. The drawing of water was consequently a laborious task. The ratepayers were quite willing to bear the cost of putting down a pump.

Holywood (Co. Down) U.D.C.—The council are urging the Local Government Board to sanction the construction of a new reservoir at the waterworks.

Huddersfield T.C.—It has been reported to the Electricity Committee that in view of fresh demands upon the works by consumers requiring additional power for war purposes there is an immediate necessity for extension costing £90,000 if such demands were to be met. The committee resolved that they were prepared to spend the money conditionally upon the Government making a grant of a portion of the excess capital expenditure due to war conditions. For the present several applications for power had been refused.

Lepton U.D.C.—The council have approved the application of the Huddersfield Town Council to the Board of Trade for a Provisional Order to supply electricity within the urban area.

Newport (Mon.) T.C.—The town council on Tuesday last decided to apply to Parliament for powers to proceed with the Talybont water scheme. It was stated that it would be dangerous to experiment with the Severn Tunnel scheme. Newport considered it in 1890, and rejected it. Cardiff also had thrown it out, and Chepstow, which was near the Severn Tunnel, wanted water, but did not think it suitable. There was sufficient water at Talybont to supply a future population of 200,000.

Newry U.D.C.—A detailed report of a satisfactory character was submitted to the council by the surveyor (Mr. Charles Blaney) in reference to the recent scraping of the 10-in. main from the culvert on Derrymore-hill to the service reservoir, the total cost of the work, including new air valve and castings and materials supplied, amounting to about £80.

Norwich T.C.—It was reported by the Electricity Committee that as a result of last year's operations of the undertaking, the balance carried to the appropriation account was £10,732, compared with £7,011 in the previous year.

Penzance T.C.—As a result of the recent pumping operations at Poltegan well, supplying the Penzance reservoirs with water, it has been discovered that the spring bored through on January 24th last when sinking the new deep well 18-in. borehole, under the supervision of the deputy borough surveyor (Mr. Henry Maddern), is of sufficient strength and volume to burst through the concrete securing the bottom end of the guide tube to the rock. This additional influx of water had a material effect in keeping the town and naval base fully supplied during the recent drought.

Pontypool R.D.C.—The council are making urgent representations to the Local Government Board to reconsider their decision not to grant a loan for the Ponthir (Mon.) water supply.

Redcar U.D.C.—The council have agreed to a scheme for the extension of the waterworks at Upleatham.

West Bromwich T.C.—It was reported that last year's nett deficiency on the electricity undertaking was £10,839.

MISCELLANEOUS.

Birmingham T.C.—The city council recently acquired the residence, with 12½ acres of land, at Rednal, of the late Mr. A. S. Johnstone. The purchase of this estate will enable the Parks Committee to effect a great improvement to the approach to Beacon-hill, and provide sports fields, tennis courts and bowling greens, which are in much demand by visitors. There is also a proposal for the laying out of a municipal golf course between the hills, and it is understood that the Parks Committee may make a recommendation on the subject.

Blackpool T.C.—The town council have entered into a contract to purchase the undertaking of the Blackpool and Fleetwood Tramroads Company.

Dorchester T.C.—In answer to the proposal of the town council to appoint the borough surveyor as temporary substitute for Mr. Groombridge, the sanitary inspector, on his joining the Army, the Local Government Board have written that the council should endeavour to secure the services of a substitute ineligible for the Army, and not necessarily certificated, as he could do duty under the supervision of the borough surveyor. The board did not think that the surveyor could spare time to carry out the routine duties of inspector. The town council resolved to advertise for a man to take office temporarily, and also to endeavour to get from the County Appeal Tribunal an extension of Mr. Groombridge's exemption.

Shrewsbury T.C.—It is proposed to instal an improved fire alarm system, to include eight call boxes or pillars, in connection with the police station.

PERSONAL.

Mr T. Moulding, city surveyor of Exeter, has been appointed fuel overseer for the city.

Mr. T. McMeckan, borough surveyor of Liskeard, has been appointed borough fuel and lighting overseer.

Mr. J. H. Sharpe, surveyor to the Rugby Urban District Council, has been appointed local coal overseer.

Mr. Harold Settle, borough surveyor and engineer of Great Torrington, has been appointed to act as local fuel overseer.

Mr. D. Barton, engineer and surveyor to the Cheadle and Gatley Council, has been appointed deputy borough surveyor at Hammersmith.

Mr. L. S. McKenzie, city engineer of Bristol, has been appointed local fuel overseer under the Household Fuel and Lighting Order.

Mr. Evan Evans, county surveyor of Carmarthenshire, has had his salary increased £100 a year "in recognition of long and faithful services."

Mr. W. E. Riley, architect to the London County Council and superintendent architect of metropolitan buildings, whose retirement was due, has consented to remain in office until October, 1919.

Mr. James Johnston, for many years resident engineer and manager of the Brighton waterworks, has been appointed local fuel overseer under the scheme of rationing coal, gas and electricity.

Mr. F. Latham, borough surveyor of Penzance, having returned from active service, has resumed his official duties. During his absence his work has been carried on by Mr. Henry Maddern.

Mr. R. M. Gloyne, second officer for the district north of the Thames in the chief engineer's department of the London County Council, has had his salary raised from £750 to £800 a year, and Mr. J. P. Harris, principal assistant engineer in charge of the main drainage system south of the Thames, has had his salary increased to £700 by four annual increments of £25, and afterwards by two annual increments of £50.

At the last meeting of the council of the Institution of Municipal Engineers the applicants whose names are set out below were recommended for admission as members:—

S. Allpress, surveyor, Belchamp Rural District Council.

O. W. Berry, surveyor, Wells Rural District Council.

Geo. Blackborough, engineer and surveyor, Luddenden Foot Urban District Council.

Fred Boothroyd, surveyor and water manager, New Mills Urban District Council.

Geo. Bray, engineer and surveyor, Holmfirth Urban District Council.

A. J. Bright, assistant engineering inspector, The Road Board (Southern Command).

J. F. Burford, borough surveyor, Launceston.

Burnett Bullock, engineer and surveyor, Mitcham Urban District Council.

Chas. Dickinson, surveyor, Haydock Urban District Council.

J. R. H. Edmondson, surveyor, Handforth Urban District Council.

J. W. Emmett, surveyor, Leyburn Rural District Council.

W. J. Foley, assistant county surveyor, Kerry.

L. Foster, surveyor, Ampthill Rural and Urban District Councils.

F. A. Fuber, surveyor, Quarry Bank Urban District Council.

G. W. Hamar, surveyor, Clun Rural District Council.

W. W. Harvey, borough surveyor, Saltash.

T. Hibbert, surveyor, Cirencester Urban District Council.

John Hobbs, highway surveyor, Elham Rural District Council.

E. Kitney, surveyor, Ringwood Rural District Council.

E. P. Mackay, acting surveyor, Romford Urban District Council.

T. McMeikan, borough surveyor, Liskeard.

W. A. Parry, architect, surveyor and engineer, Llandilo Urban District Council.

W. P. Perkins, surveyor, Witham Urban District Council.

T. F. Pickering, surveyor, Heath Town Urban District Council.

A. Plunkett, surveyor, Bredbury and Romiley Urban District Council.

Mr. A. Riley, surveyor, Shelf Urban District Council, was recommended for admission to associate membership.

Frank Rist, acting engineer and surveyor, Tutbury Rural District Council.

F. T. Thorp, surveyor, Faringdon Rural District Council.

Bertie White, highway surveyor, Totnes Rural District Council.

J. T. Wiseman, highway surveyor, Malton Rural District Council.

W. Withers, highway surveyor, Alcester Rural District Council.

OBITUARY.

Mr. Wilson Calvert, for twenty-six years surveyor to the Hebden Bridge Urban District Council, who retired in 1907, died, we regret to state, at Littleborough recently at the age of seventy-five.

Mr. J. C. Waters, surveyor to the Blofield Rural District Council, whose death was reported at the council meeting on Tuesday last, was described as a most trustworthy and capable official in every respect.

HOUSING NOW AND AFTER THE WAR.

THE LANARKSHIRE SCHEME.

It is announced that the Treasury have agreed to the Lanarkshire housing scheme, subject to certain conditions, which will be communicated to the local authorities concerned.

YORKSHIRE AND MIDLAND CONFERENCES.

At a conference of Yorkshire local authorities, which was held at Leeds last week, resolutions were passed in favour of extending the time limit for the commencement of schemes to three years after the war, suggesting that only schemes should receive the approval of the Local Government Board whose lay-out was on town-planning lines, and appealing for emergency legislation authorising the local authorities to acquire land for housing at a reasonable price and with such expedition that there would be no delay in carrying out schemes after the war. A conference representing the Midlands and Central Wales, which assembled at Birmingham on Tuesday last, passed a resolution appealing for modifications in terms which would ensure that grants in aid of deficits on schemes would be made on the actual deficits, and that the loss to be borne by local authorities on all schemes carried out in any one administrative area should not exceed the proceeds of a penny rate.

A scheme of building in Greater London, under the Housing of the Working Classes Act, involving an expenditure of £3,500,000 in seven years following the declaration of peace, was adopted on Tuesday by the London County Council.

FOR OTHER ADVERTISEMENTS
See End of Paper.

CIVIL ENGINEER (28), ineligible, experienced in design and construction of waterworks, sewage disposal, ferro-concrete, wooden structures, desires municipal or other appointment. Good draughtsman, accurate leveller.—Box 1,665, Offices of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4. (3,835)

NATIONAL SALVAGE.

APPOINTMENT OF DISTRICT ADVISERS.

The following gentlemen have consented to act in an honorary capacity as district advisory officers of the National Salvage Council:—

Mr. John Brodie, city engineer, Liverpool.
Mr. R. Diggle, chief sanitary inspector and cleansing superintendent, Accrington.
Mr. E. J. Elford, city engineer, Cardiff.
Mr. Jas. Jackson, cleansing superintendent, Birmingham.
Mr. Matthew Jones, city engineer, Chester.
Mr. John Terry, cleansing superintendent, Nottingham.
Mr. J. Gibson, cleansing superintendent, Edinburgh.
Mr. W. Greig, cleansing superintendent, Glasgow.

All local authorities in the districts allocated to these advisers will be notified by the Director-General of National Salvage, in order that the adviser's visits may be recognised as official.

Odours from Sewage Works.—At the last meeting of the Keynsham Rural District Council Mr. Christopher Williams drew attention to the increasing nuisance caused at Saltford by the smells from the Bath sewage works. At night it became almost intolerable. The chairman replied that they were told by the medical officer for the district that the smell was not prejudicial to health. Mr. Williams contended it was very objectionable, and was decidedly prejudicial to the rateable value of the district. Mr. Watts, the inspector, was instructed to communicate with the town clerk of Bath on the matter.

APPOINTMENTS VACANT.

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TEMPORARY ARCHITECTURAL ASSISTANT AND SURVEYOR.—July 27th.—Swindon Town Council.—Mr. R. Hilton, town clerk, Town Hall, Swindon.

INSPECTOR OF NUISANCES.—July 30th.—Dorchester Town Council.—Mr. J. W. Miller, deputy town clerk, Dorchester.

TEMPORARY ASSISTANT SURVEYOR.—July 30th.—Devon County Council.—Mr. R. M. Stone, county surveyor, No. 1 Division, The Square, Barnstaple.

TEMPORARY ENGINE-DRIVER.—July 30th.—Stourport Urban District Council.—Mr. A. D. Capel Loft, clerk, Council Offices, Stourport.

TEMPORARY SURVEYOR AND INSPECTOR OF NUISANCES.—August 5th.—Yiewsley Urban District Council. £200 a year.—Mr. W. H. Lea, clerk, Council Offices, Yiewsley, Middlesex.

GAS ENGINEER AND MANAGER.—August 7th.—Ashton-in-Makerfield Urban District Council.—Mr. A. Sykes, clerk, Urban Council Offices, Ashton-in-Makerfield.

SURVEYOR OF HIGHWAYS AND INSPECTOR OF NUISANCES.—August 9th.—Buckingham Rural District Council. £245 per annum.—Mr. Thomas R. Hearn, 26 West-street, Buckingham.

ELECTRICAL ENGINEER.—August 12th.—Ebbw Vale Urban District Council. £250—£300 a year.—Mr. T. Hughes, clerk.

TEMPORARY ENGINEERING ASSISTANT.—Bedford Town Council.—Mr. N. Greenshields, borough engineer and surveyor, Town Hall, Bedford.

SURVEYING AND ARCHITECTURAL DRAUGHTSMAN.—Birmingham City Council. Three guineas per week.—Mr. Henry E. Stilgoe, city surveyor and engineer, The Council House, Birmingham.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

LINTHWAITE.—July 31st.—For the erection of a fence wall.—Mr. A. Mallinson, surveyor, Urban Council Offices, Linthwaite, Yorks.

Engineering: Iron and Steel.

FOLESHILL.—July 30th.—For sale, an 8-in. bucket and ram bore-hole pump, by Tangye, Birmingham.—Mr. A. E. Newey, engineer and surveyor, Rural Council Offices, Foleshill, Warwick.

BISHOPTHORPE.—August 8th.—For the sale by the council of a 7-h.p. steam tractor engine, by Robey, Lincoln.—Mr. C. Cecil Lucas, clerk, Urban Council Offices, 6 New-street, York.

BELFAST.—August 16th.—Supply of electricity plant.—Mr. T. W. Bloxam, city electrical engineer, Belfast.

CHELTENHAM.—For the supply of tar-macadam and screening plant, new or second-hand. — Mr. J. S. Pickering, borough engineer, Municipal Offices, Cheltenham.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories, &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

Sanitary.

BURRY PORT.—August 3rd—6th.—For the construction of an outfall sewer comprising about half a mile of 15-in. cast-iron and stoneware pipe sewers, manholes, &c., 15-in cast-iron sea outfall and other incidental works.—Mr. A. P. I. Cotterell, engineer, 17 Old Queen-street, Westminster.

NANTWICH.—August 12th.—For the construction of about 140 yds. of 9-in. sewer.—Mr. W. Williams, surveyor, Urban Council Offices, 26 Pepper-street, Nantwich.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

JULY.

27.—Royal Sanitary Institute: Sir Henry Tanner on "Housing, from the Point of View of Economy in Planning and Construction." Ipswich Town Hall, 11 a.m.
27.—Institution of Municipal and County Engineers: Meeting at Maidstone.
27.—Institution of Municipal Engineers: Eastern and North-Eastern District meeting at Spalding.

AUGUST.

16-17.—Institution of Municipal and County Engineers: Meeting at Abergavenny.
19-20.—Institute of Cleansing Superintendents: Annual conference at Stockport.

SEPTEMBER.

14.—Institution of Municipal and County Engineers: Meeting at Bridgwater.
27-28.—Institution of Municipal and County Engineers: Meeting at Penarth and Barry.

APPOINTMENTS OPEN.

BOROUGH OF BEDFORD.
TEMPORARY ENGINEERING ASSISTANT.

Wanted, in the Borough Engineer and Surveyor's Office, a temporary Engineering Assistant (ineligible for Military Service).

Applications, in candidate's own handwriting, stating age and salary required, and giving full particulars as to experience, and accompanied by copies of not more than three recent testimonials, to be sent to the undersigned not later than Monday, August 19th.

Canvassing will disqualify.

N. GREENSHIELDS, ASSOC.M.INST.C.E.,
Borough Engineer and Surveyor.

Borough Engineer and Surveyor's Office,
Town Hall, Bedford.
July 23, 1918. (3,833)

DEVON COUNTY COUNCIL.
TEMPORARY ASSISTANT SURVEYOR.

Applications are invited for the post of temporary Assistant Surveyor to take charge of about 42 miles of Main Road in the Bideford Rural District.

Applicants must thoroughly understand the disposition of labour and the care of machinery employed in quarries and road making, and be capable of riding a bicycle or motor bicycle, for which an allowance will be made.

Applications, stating experience and salary required, endorsed "Temporary Assistant," and accompanied by not more than three recent testimonials, must reach the undersigned not later than July 30th, 1918.

R. M. STONE,
County Surveyor,
No. 1 Division.

The Square,
Barnstaple.
July 13, 1918. (3,827)

RURAL DISTRICT COUNCIL OF BUCKINGHAM.
SURVEYOR OF HIGHWAYS AND INSPECTOR OF NUISANCES, TEMPORARY.

The above Council invite applications for the above temporary appointment. The area of the District is 54,893 acres (over 85 square miles), and 150 miles of highways.

The person appointed will be required to devote the whole of his time to the duties of the various offices. He must be competent to perform the duties of a Highway Surveyor, to keep the accounts, prepare plans and estimates, and he will be required to perform the duties of an Inspector of Nuisances under the Public Health Acts, Factory and Workshops Act, Petroleum Acts, the Dairies, Cowsheds, and Milkshop Order, the Council's by-laws and regulations; to make inspections and keep records under the Housing (Inspection of District) Regulations, 1910, and to carry out all such other duties as the Council or the Local Government Board may from time to time direct, and his appointment will have to be approved by the Local Government Board.

The person appointed will also be required to act as Inspector under the Local Food Control Committee, and as Coal Overseer, Inspector and Secretary to the Committee for the District.

Applicants must be ineligible for service in His Majesty's Forces. The engagement will be for the period the present permanent officer is absent on military duties, and subject to one month's notice on either side.

The salary will be as follows, namely: As Surveyor of Highways and Inspector of Nuisances, at the rate of £160 per annum; as Inspector under Food Committee, at the rate of £25 per annum; and as Coal Overseer, Inspector and Secretary to the Committee, £60 per annum.

Candidates must provide a motor cycle for travelling the District, towards which £7 per annum and actual cost of petrol will be allowed.

The person appointed will be required to give security in the sum of £100 in some recognised guarantee society.

Applications, in writing, stating age, previous experience and qualifications, accompanied by copies of three recent testimonials, must reach the undersigned on or before Friday, the 9th day of August, 1918.

Canvassing members of the Council, directly or indirectly, is prohibited, and will disqualify.

THOMAS R. HEARN,
Clerk of the Council.

26 West-street, Buckingham.
July 17, 1918. (3,832)

TENDERS WANTED.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

BISHOPTHORPE RURAL DISTRICT COUNCIL.
STEAM TRACTION ENGINE AND WAGONS FOR SALE BY TENDER.

The above Council are open to receive Tenders for the purchase of a 7-h.p. steam Traction Engine, by Robey, Lincoln, in perfect working order, together with two 10-ton Trailer Wagons. Can be viewed near Copmanthorpe Station (N.E.R.), on appointment being made with Mr. J. H. Dykes, Highway Surveyor, 6 Blake-street, York. Sealed Tenders, marked "Tender for Traction Engine," to be sent to me before 8th August.

C. CECIL LUCAS,
Clerk.

6 New-street, York. (3,831)

MISCELLANEOUS.

FOR HIRE, 10-ton and 12-ton Steam Road Rollers and Scarifiers, with or without drivers.—W. W. Buncombe, Engineer, Highbridge, Somerset. Telephone, 12 Highbridge.

FOR IMMEDIATE SALE, owing to Export Licence being refused, one new 5-ton Undertype Steam Tipping Wagon, on steel tyres.—Mann's Steam Wagon Company, Leeds. (3,834)

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH EXPANDED METAL.

EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet. Mr. SAMUEL HUTTON, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED
(Patentees and Manufacturers of Expanded Metal).
Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.
Works: STRANTON WORKS, WEST HARTLEPOOL.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. AUGUST 2, 1918. No. 1,385.

Minutes of Proceedings.

Engineers and the Ministry of Health.

Attention should be given to the fact that recent leading articles in the *Times* dwell upon the importance of sanitary engineering in connection with the new Ministry of Health. To engineers the matter is so obvious as to be scarcely worthy of comment, but on the other hand this is not the case with the general public or with our legislators, who in considering matters of public health are in the habit of regarding the medical side as being of importance and all embracing, quite forgetting that unless the engineer follows the medical adviser the required reforms cannot possibly be carried out. The first article in the *Times* to which we draw attention dwelt upon the importance of team work as applied to medical matters, showing that in order to treat any serious case properly the advice of various specialists was required, for it is certainly quite impossible that one individual can possess the medical knowledge and skill required for the perfect treatment of a complicated case; but the inference went further than this in mentioning works of sewage disposal and water supply, where again it is certain that the medical man, the chemist, bacteriologist, the geologist, the engineer and even the lawyer each has his separate section of the work to attend to. The importance of "team work" in all matters relating to public health is clear to the writer of the article. In the second article to which we drew attention the importance of the sanitary engineer in all branches of scientific work having the maintenance of the public health as their object was emphasised. Attention was drawn to the fact that a badly constructed drain might contaminate a water supply and produce an epidemic, the effects of which might be felt to the ends of the earth. The article dealt with the medical *entente* between the doctors of this country and those of America. Closer relationship and an interchange of ideas and schemes of work are what the medical men want at the present time, and the writer of the article in the *Times* drew attention to the need for all scientific workers dealing with matters pertaining to the public health to be included in this better understanding with the Americans. There is no doubt, as we have often pointed out in these pages, that English engineers have much to learn from the Americans, and it to be hoped that the Americans have also something to learn from us. An interchange of ideas and a closer relationship is desirable not only with the American engineers but with engineers from the Colonies, and it is to be noted that a great many of these men are now on active service, and have come to this country in that capacity. If the various engineering institutions and individuals, and particularly municipal engineers, held out the hand of friendship in some definite manner to their brother engineers from the Colonies and from the United States it would lead to much good feeling, and would be in every way beneficial to all concerned. The fact that the daily Press, as shown by the *Times* articles, has really begun to have a better understanding of the work of the sanitary engineer is most important. The education of the public in this respect is necessary if the Ministry of Public Health is really to prove a success.

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The Dirt Problem.

Dirt is the subject with which a writer in the *New Statesman* deals, with the view of suggesting, without proving, that London is a dirtier city at the present time than it has been for a generation. In expounding his theme the writer remarks that there are still doctors to be found who believe that cleanliness is something of a superstition. What precisely this implies we hardly know, but if it means that we may have too much cleanliness we must take leave to deny the soundness of such an idea. Cleanliness, after all, is just cleanliness, and the more we have of it the better. If there are medical men who question its efficacy we should be inclined to believe that they have missed their calling, and should promptly renounce it for some other. The writer is on safer ground when he expresses a wish that somebody would begin a movement to sweep our streets and empty our dustbins, except, of course, for the fact, fatal to his argument, that there is no necessity to begin such a movement, as it was started long before he saw the light, and continues in full swing to-day. He gives his whole case away, so far as this deals with a fling, quite good-natured, at the municipal authorities, by admitting that "all the men who used to help to cart away the rubbish have been turned into soldiers." Not all, fortunately, though more than can be spared with safety when the objective is a high standard of cleanliness and sanitation. After all, the bills of mortality would quickly tell us if we had reached the danger line of neglect or inefficiency, and this they have not done up to now. The fact is that the public have sensibly taken in the situation, and are—for their own sakes—assisting the authorities to deal with the dirt problem, and here they are indubitably doing the right thing. This is why, on the whole, London and other large towns remain clean and wholesome in spite of the abnormal conditions in which sanitary administration is carried on.

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The War and Roads.

In addressing the recent annual meeting of the Institution of Municipal and County Engineers on "Roads During and After the War," Mr. Hooley, whose very able paper will be found in another column, chose a subject of immediate and pressing importance. It is common knowledge that since the fateful summer of 1914 the old standard of highway maintenance, of which we were justly proud, has very seriously depreciated. This lowering of standard is due to two principal causes—namely, the impossibility of obtaining labour, materials and plant for necessary repairs, and abnormal wear and tear due chiefly to traffic connected with the war. In some districts, moreover, the inevitable deterioration has been aggravated by a deliberate policy of starvation pursued under the cloak of miscalled economy. To these and all highway authorities Mr. Hooley offers the soundest advice when he points out that the wisest course to pursue under existing conditions is to prepare at least the main roads for the increased burden of heavy motor traffic which they will certainly have to bear after the war. Surfacing to any considerable extent is at present out of the question, and attention should be directed as far as possible to foundations, sub-crusts and abutments. The ideal to be aimed at is, in Mr. Hooley's opinion, a foundation according to Telford, a sub-crust according to Macadam, and a finished surface of lasting material finished on approved modern principles. The danger is lest the real importance of an efficient highway system may be overlooked among the multiplicity of other urgent problems of reconstruction, and we must look to expert opinion organised through the various professional institutions to see that such a national disaster does not occur.

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Rural Road Maintenance.

The long continuance of war conditions has put an entirely new complexion on the always important question of rural road maintenance, in consequence of the necessity that has arisen for using them for various kinds of heavy traffic which they were never designed or intended to carry. Indeed, it is no uncommon thing to-day for a purely rural road, with inadequate foundation and little or no provision for drainage, to be bearing traffic of a class which would put a serious strain on the capacity of a well-made main highway. In most cases, too—particularly where roads are being used for the haulage of timber—it is impracticable to recover the cost of repairs, as

expenses due to damage done by extraordinary traffic. The result is that a crushing financial burden is placed on the shoulders of many of the smaller highway authorities. In the course of a carefully prepared paper which he submitted at the recent annual meeting of the institution, Mr. J. A. Webb suggested that in the case of timber hauled for use in national work, at any rate, the State might fairly be asked to make a grant towards the cost of reinstating the damaged road surfaces. So far as the future is concerned, it would take a generation or more to strengthen rural roads so as to enable them adequately to bear heavy traffic of the kind indicated. A considerable proportion of damage might be avoided, however, by paying more attention to the construction of vehicles. Improvements in balancing, position of springs, width of tyres and in construction generally would go far to relieve a situation which is becoming increasingly serious, and the enforcement of such improvements would provide well-deserved encouragement to surveyors who are facing the problem from the road point of view with a courage which is little less than heroic.

GRANITE CHIPPINGS AND CYCLISTS.

UNSUCCESSFUL CLAIM AGAINST LIVERPOOL CORPORATION.

In the Liverpool County Court recently (the *Liverpool Post* reports) George Milne, an insurance broker and commission agent, claimed damages from the Liverpool Corporation in respect to the tyre of his bicycle, which, he alleged, was burst by coming in contact with granite chippings placed on Ullet-road by the corporation, against whom he alleged negligence and misfeasance. Alternately he contended that the placing and leaving of the chippings on the road was a nuisance.

Plaintiff, a cyclist of thirty years' experience, and a member of the council of the Cyclists' Touring Club, gave evidence as to the tyre of his machine bursting owing to the sharp granite chippings which had been placed on the road. The tyre, which he admitted had been in use over twelve months, was unreparable and he had to obtain a new one.

Answering Mr. Procter (for the town council), plaintiff said the method of maintaining roads by gritting them with chippings was a bad one, though it was adopted by the National Road Board and other highway authorities throughout the country. He admitted that he saw the chippings on the road, but continued on his journey, though he tried to avoid them.

Several cyclists gave evidence as to the method adopted being one that was likely to damage cycle tyres, and it was suggested that the proper method was to roll the chippings in or else use gravel on Tarmac roads.

For the defence, Mr. J. A. Brodie, city engineer of Liverpool, and Mr. C. Brownridge, borough engineer of Birkenhead, gave evidence as to the method adopted being the universal and proper one, and both said that if the chippings were rolled in the object of putting them down would be defeated, as there would be no secure foothold for horses under certain weather conditions. Mr. Brodie added that in six months 180,000 cyclists passed over Ullet-road, and this was the first complaint received.

After hearing legal submissions from Mr. Procter and Mr. Newman, the judge held that the method adopted was the proper one, that plaintiff's tyre was a worn one, and that even if there had been any negligence on the part of the corporation—and he found that there was not—plaintiff had seen the obstacles and had elected to take the risk. He gave judgment for the defendant corporation, with costs on the higher scale, as the case was of public importance.

Electric Power Supply.—Asked what action he proposed to take on the report of the Committee on Electric Power Supply, the President of the Board of Trade stated in the House of Commons that he was not yet in a position to make any statement on the subject.

Rural Council's Responsibility for a Road Accident. — At Newton Abbot County Court recently Moretonhampstead Co-operative Society sued Newton Abbot Rural Council for damages sustained by a horse falling in a pit in the road at Moretonhampstead. Harry Aggett, in the society's employment, was driving a horse and trap. He looked back for a moment to see if his parcels were all right, when his horse put his right fore leg into a pit, fell, and sustained severe injury. The council was dealing with the road to mend a leak in a pipe, and a contractor's man had dug a pit 3 ft. deep. No one was in charge of the pit, and there was no notice board to indicate its existence. The defence was that if the driver had used his eyes he must have seen the pit. His Honour, giving judgment for £87, said he could not hold the driver guilty of contributory negligence because for the moment his attention was diverted from the direction in which he was going. There was negligence on the part of defendants in leaving the pit open.

NATIONAL KITCHENS.

PUBLIC BATHS UTILISED AT WANDSWORTH.

The first of six national kitchens which it has been decided to establish in the metropolitan borough of Wandsworth was formally opened recently. The borough has an area of 9,199 acres and a population of 345,000.

The kitchen has been installed at the Wandsworth public baths, the first class and part of the second class swimming baths being utilised for the purpose. Steam, hot and cold water, electric light and gas being available on the premises, the building, which is in a good state of repair, is particularly suitable for this object.

The floor space occupied by the kitchen and store-rooms, &c., is 2,292 sup. ft., and by the restaurant 3,439 sup. ft. The accommodation provided consists of:—Kitchen, 34 ft. by 44 ft., with supervisor's office and ticket office; two store rooms, fitted with lockers and shelves; larder; cloakroom with lavatory accommodation for staff; restaurant, 80 ft. by 44 ft., fitted with thirty-six tables and a display table near the entrance.

The kitchen equipment consists of four 40-gallon C.I. steam-jacketed vegetable and soup pans, fitted with draw-off taps, strainers and counter-balanced lids; one six-compartment pudding and vegetable steamer; one steam-heated carving table and hot cupboard; one steam hot-water kettle; one five-shelf electric pastry oven; one electric roaster; four electric grillers; two electric fish fryers; one electric mincing machine capable of treating 300 lb. to 400 lb. of meat per hour, with 2-h.p. dynamo attached; one electric potato-paring machine capable of treating 40 lb. to 50 lb. of potatoes per minute, and worked by the dynamo attached to mincing machine (the parings are discharged through the wall into receptacle outside and collected for pig food, &c.); one gas griller; one galvanised iron vegetable sink with draining table, hot and cold water supply; one galvanised iron pot sink with draining tables, hot and cold water supply, and grease overflow discharging into a Doulton's grease-collecting trap outside (all grease is collected and sold to dealers); one galvanised iron crockery sink with hot and cold water supply; draining tables, &c.; dresser bench, two tables and working benches; a service counter 27 ft. long separates the kitchen from the restaurant.

The kitchen is intended to serve parts of the Fairfield, Southfield and Springfield districts of the borough, with a population of over 100,000, and to supply the needs of all classes.

The scheme provides for cooking and supplying about 2,000 portions per day, and restaurant accommodation for about 200 persons.

A paid staff will be in attendance—viz.: Three cooks, two cleaners and a cashier, and the kitchen will be open daily (Sundays excepted) between the hours of 11.30 a.m. and 1.45 p.m., and 4 to 7 p.m.

The total expenditure incurred in installing and equipping the kitchen is as follows:—

	£ s. d.	£ s. d.
Adapting and altering existing premises, including drainage and cleansing works	112 6 5	
Providing and laying steam, hot and cold water supplies, &c.	147 3 10	
Electric wiring	64 10 0	
		324 0 3
Equipment:—		
Cooking appliances	894 4 3	
Utensils, crockery, cutlery, &c. ...	204 0 9	
Furniture and fittings	166 18 0	
Miscellaneous items, say	60 16 9	
		1,325 19 9
Total to date...		£1,650 0 0

The charge for electricity for cooking purposes is 1·15d. per b.t.u., and the price of gas is 3s. 5d. per 1,000 cub. ft.

The makers of the kitchen equipment include the Carron Company, Limited, the Brompton and Kensington Electric Accessories Company, the Hobart Manufacturing Company, and the Imperial Machine Company.

The work was carried out by the following contractors:—

Cooking appliances and joinery—Staines Kitchen Equipment Company, Victoria-street, S.W.

Gas boiling plate—Davis Gas Stove Company, Oxford-street, W.

Electric wiring—Philpot Bros., Upper Tooting-road, S.W.

Restaurant fittings, &c.—J. Nutting & Sons, Oldridge-road, Balham, S.W.

Plumbing—T. and W. Baker, West Hill, Wandsworth, S.W.

The plans were prepared by and work carried out under the supervision of Mr. P. Dodd, M.Inst.C.E., the borough engineer, the drainage work being done by the council's workmen.

Public Works in Stretford.*

By ERNEST WORRALL, F.S.I., Engineer and Surveyor.

The district is in the watershed of two rivers: the Irwell (canalised and now the Ship Canal) draining the north-easterly portion, and the Mersey the south-westerly area. Prior to the construction of the Ship Canal the more populous, easterly end of the district drained to the Irwell chiefly through a 6-ft. barrel sewer. The "locking" of the upper end of the canal to a height of 13 ft. above the next lower reach submerged that sewer, and methods and ideas as to the disposal of sewage were also undergoing radical change.

Simultaneously the main-drainage proposals of the Manchester Corporation were maturing, and the outfall to Davyhulme being through Old Trafford and Stretford it cut off the northern end of the district from other means of drainage. On the principle that if Manchester needed the district for its sewer, Stretford required the sewer for its district thus severed, Stretford petitioned and was admitted by the Local Government Board as a co-partner in the city scheme, contributing *pro ratâ* to user on the bases respectively of population and rateable value to the first cost and maintenance. The limitation in the agreement of rain or storm water from the area to "⅜ in. in and during twenty-four hours" involved litigation for an interpretation of that term. A review of the controversy would occupy too much space and might not be of general interest. Stretford succeeded on the main issue in the arbitration proceedings and, on the arbitrator's reference, in the Higher Courts, also in the Court of Appeal.

The limitation of ⅜ in. per diem has sufficed while much of the area was undeveloped and unpaved, but in view of the passing of those conditions the council secured unlimited user on the principle and basis of contribution before mentioned, when Manchester in 1911 went to Parliament on a second scheme of arterial sewers having its main outfall also through Stretford. These outfall sewers through the district have varying sizes up to 14 ft. by 10 ft. 6 in. and 15 ft. 3 in. diameter respectively. They are the largest sewers known to the author in the country. A storm overflow sewer discharging to below the Mode wheel locks on the Ship Canal also has the capacious diameter of 9 ft. Other relief sewers on the system in the northern drainage area have diameters of 3 ft. 9 in. and 3 ft. 6 in. respectively. The tributary district sewers are of ordinary types ranging from 1 ft. to 6 ft. in diameter and call for no special description.

The southerly half of the district in the watershed of the Mersey drains to the Stretford sewage farm at the extreme south-westerly corner of the district, adjoining Urmston.

The farm was laid out by Mr. Royle in 1885 for the reception and treatment of sewage from that area when there was a population of about 8,000. It had an area of 40 acres, afterwards enlarged to 77 acres, of which 50 acres were available for treatment. In 1900 it received 450,000 gallons a day from about 10,000 people, and the average analysis of twenty-three samples taken by the rivers' authority over the previous six years was ·30 gr. per gallon on the four-hours' oxygen-absorption test. For the ten years 1908-17 the average was ·46 gr. per gallon. Near the end of this decade the figure was adversely affected by an unusual discharge of tar from a local works. The sewage was received in an underground open tank or lagoon and pumped thence into an overground tank, giving head for a flow through rising mains and carriers over the land. The three pulsometer pumps, 14 ft., 10 ft. and 8 ft. respectively, were operated by steam at about 70 lb. pressure from two 16 ft. by 6 ft. 6 in. Lancashire boilers. Their efficiency, measured by fuel costs, was low and decreased year by year with the increasing flow and volume of sewage. From 1900 to 1906 the yearly expenditure on fuel was: 1900, £213; 1901, £310; 1902, £285; 1903, £275; 1904, £342; 1905, £310; 1906, £422.

SCRAPPING AN OBSOLETE PUMPING PLANT.

In 1906 the author advised the council to scrap the plant and, after estimating the cost of power by reciprocating steam engine, town gas, electricity and suction gas, to replace it with a producer-gas plant, engine and centrifugal pumps. The scheme was adopted and comprised a 50-h.p. "Dynamic" producer set, a "National" horizontal engine, 14 in. and 8 in. "Gwynnes'" pumps, and a C.I. sectional tank by Newton and Chambers. The cost, borne out of revenue, was £700.

A marked saving therefrom in fuel is shown by the subsequent annual costs: 1907, £260; 1908, £201; 1909, £211; 1910, £181; 1911, £196; 1912, £131. Anthracite fuel was used in the earlier producer set. To further economise on an increasing volume and load the producer set was replaced in 1913 by a larger one to consume coke, and the fuel costs have since been: 1913, £198; 1914, £197; 1915, £228; 1916, £163; 1917, £179. Gasworks coke was first used, but the tarry deposits fouled the engine valves, causing back-firing and trouble in the generator with attendant risks to the firemen from ejected carbon-monoxide gas. The trouble was eliminated by the use of blast-furnace coke.

The above figures are given in detail as a concrete instance of saving effected by the complete scrapping of an obsolete plant. Had the change not been made and the fuel costs grown as in the earlier years they would now be round £750 as against £200—a saving of £550 a year by an outlay of £800.

The first sewers of Stretford, like those of other old towns, were laid to accommodate only the current needs of those of the near future. As a result the arteries have had to be supplemented from time to time, a need accentuated by the flatness of the district and the obtainable gradients.

SEWAGE TANKS AND PUMPS.

A report of the author in 1913 dealt at length with the need at the farm of additional tank accommodation, and compared the merits of storage and sedimentation in underground tanks before pumping with those of overground tanks after pumping. The latter were recommended and adopted with a view to construction after the storm sewer. Contracts were provisionally let and application made for borrowing powers to the Local Government Board, but the work is in abeyance until after the war.

The two tanks will be in reinforced concrete with a capacity each of 500,000 gallons. They are designed to be self-contained, automatic in action, and to distribute the sewage after sedimentation by quiescence to any part of the enlarged farm (120 acres) and the sludge to the draining beds. The new pumping set will comprise two horizontal shunt wound D.C. motors of 35 and 18 b.h.p. each, coupled direct to 12 in. and 9 in. centrifugal pumps in the base of a well chamber and automatically controlled by the rise and fall of the sewage level. The existing producer plant and pumps will be retained as a stand-by set. The aggregate capacity against the static head of 24 ft. will then be 14½ million gallons a day.

The tanks and pipes are so placed as to admit of extension or duplication, and will form an integral part of a later scheme of filtration beds if and when these become necessary to supplement the treatment of the sewage by land filtration.

ROAD IMPROVEMENTS.

A legacy from old and slower times of narrow roads has been vigorously administered by the council in recent years. The co-operation of the landowners in these improvements has made them possible. Their value to the community cannot be measured by the bare figure of cost since, having been in most cases effected in advance of building developments and at no expense for land, they represent the maximum of result for the minimum of expense.

A policy of tree planting in suitable streets has been adopted in recent years, and some 2,000 trees have so far been planted. Blackley poplars predominate in numbers and success; other varieties include planes, service, sycamore and ash.

A feature in several cases has been the acquisition of considerable areas at acute intersections of roads and their lay-out as plantations, thus acquiring for all time cases of vegetation in positions where they will be of the most benefit.

HOUSING.

A housing scheme under Part 1 of the Housing of the Working Classes Act was undertaken so far back as 1893. An area known as Diamond-court was cleared at a cost of £3,890; and twenty two-storey flats comprising forty tenements were erected at a cost of £5,750 for land, houses and street work—*i.e.*, £144 each tenement. The land is subject to an annual chief rent of £34. The houses let at 3s. 3d., 3s. 9d. and 4s. 6d. inclusive a week, giving the accommodation of two, three and four rooms each respectively. The loan was sanctioned for forty years.

In 1905 a further and improved scheme of housing under Part 3 of the Act was undertaken. Land was secured for the whole scheme, and thirty-one pairs of semi-detached two-storey houses have already been erected. The remaining twenty-five pairs will be proceeded with directly material and labour are available. Lacy-street, on which the pairs erected abut, is 12 yds. wide, making with the 6-ft. set back or forecourt to the houses 48 ft. between the buildings, and that while the latter space is maintained between the houses yet to be erected it is allocated chiefly to the forecourts, thus giving more enclosure per house and less street surface to be paved. This concession was made by the Local Government Board after much representation of its merits, and the principle has since been conceded in the newer local

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*From a paper presented at a meeting of the Institution of Municipal and County Engineers held on July 19th at Stretford.

building by-laws of 1911. Some details of the scheme are given below:—

Scheme and estimated cost—erection of 112 semi-detached houses.

	£
Land	3,750
Buildings	18,765
Street works	2.500
Total	25,015 = £224 per house.

Period of repayment—Local Government Board sanctioned in 1904 an equated period—land and buildings—of fifty-eight years.

Area of land acquired—23,589 sq. yds.

Cost of land—Purchased outright for £3.684+£66 legal charges.

Area of land appropriated to each house (average) exclusive of streets—(*a*) Building site, 55 sq. yds.; (*b*) open and unbuilt upon, 96 sq. yds.

Accommodation—Each house contains three bedrooms, living-room, kitchen, scullery, coal house, water-closet, back yard and front garden, and has a frontage of 18 ft. 6 in.

Size of rooms—Ground floor—Living-room, 13 ft. by 14 ft.; kitchen, 11 ft. by 9 ft.; scullery, 9 ft. by 6 ft. Bedrooms—Front bedroom, 17 ft. by 10 ft.; back bedroom (No. 1), 12 ft. 4 in. by 7 ft.; back bedroom (No. 2), 9 ft. by 9 ft.

Rent—Each house is let at 5s. per week inclusive of rates and taxes.

Instalments of scheme:—

1907.—40 houses (20 pairs). Cost, £235 5s. per house, inclusive of land and street forming, or £173 17s. exclusive of these two items.

1911.—22 houses (11 pairs). Cost, £230 16s. per house, inclusive of land and street forming, or £170 exclusive of these two items.

The scheme is self-supporting. No charge is made for the collection of rents, the work being undertaken by the collector's department.

TOWN PLANNING.

Stretford has not figured among the claimants to priority in time or magnitude of its town plan, but it nevertheless obtained one for the whole of its district so far back as 1913. This was due again to the cordial co-operation of the landowner with the council. Not the least important feature of the arrangement is its freedom from cost to the authority. The scheme was drafted and the negotiations undertaken on the principle that new and additional roads would be needed alike for the orderly development of the town and the estate, and if only they could be placed in lines that would accommodate both interests and also the arterial roads of neighbouring districts it was worth while to approach that end by agreeing them on a plan. Mutual adjustments achieved the result.

STREET PAVEMENTS.

The main traffic roads are paved with granite setts in the carriageway, having been converted in sections from the macadam of earlier days. In 1906 following a special investigation and report the greater portion of the main Chester-road through the district was so converted for a length of 2½ miles at a cost of £16,000. A foundation of cement concrete was then introduced, the aggregate being sieved and graded from the removed macadam and used in the proportion of 3:2:1. Between the cost of the previous and subsequent repair, together with the redemption of the loan, there has been a saving of £230 a year, and there is also a better and cleaner pavement. These main roads have a width of from 18 yds to 20 yds., the carriageways being 11 yds. to 12 yds. wide The setts are mostly Welsh granite 6 in. deep by 3 in. wide by 7 in. to 9 in. long, and the paths are flagged with 3-in. Barns' flags. The macadam roads are a diminishing quantity, and there now remain only 5 miles in length in the whole district. They are tar-sprayed each year, and as various contemplated improvements mature after the war they will be further reduced by granite-sett or rock-asphalt pavements.

INSTITUTION OF MUNICIPAL ENGINEERS.

EASTERN AND NORTH-EASTERN DISTRICT MEETING AT SPALDING.

At the Eastern and North-Eastern District meeting of the Institution of Municipal Engineers, which was held at Spalding on Saturday, July 27th, there were present: Messrs. John Bailey, town surveyor of Spalding, the retiring district chairman, W. T. Unwin (March), A. Paterson (St. Faiths), A. Harford-Stevens (Blaby), A. Barton (Boston), H. W. Hawkins (Old Fletton), J. E. Crowson (Peterborough), A. Russell (Peterborough County), A. W. Broker (North Witchford), B. L. Wright (Holbeach), George Dolphin (Uppingham and Gretton), H. Blakey (Spalding), A. Redhead (Wimblington), T. Lake (Bourne), A. Steward (Uppingham), R. Bailey (Spalding), A. Butler (Spalding), A. L. Seymour (Spalding), W. Burley (Spalding), J. Garwell (Spalding), G. A. Penwill, hon. district secretary, and B. Wyand, secretary of the institution.

At the business meeting, held at the Corn Exchange, the members were welcomed by Mr. John Bailey, and a number of letters of regret for inability to attend were read from district members. Mr. Bailey thanked the members for their support during his year of office, which had been a somewhat strenuous one. The question of amalgamation was now to the fore, and his mind was open on the matter. Of one thing he was convinced, and that was that unless the institution were to be met and treated upon equitable terms it would be much better that they should remain as they were. They were making big strides, and there had recently been a most satisfactory increase in membership. It was interesting to note that that day's meeting was the first of a formal nature held by municipal engineers in Spalding. He had much pleasure in proposing Mr. Paterson, their district vice-chairman, as chairman for the ensuing year.

Mr. W. T. Unwin seconded the proposal, and remarked that it was understood at their last meeting that the vice-chairman should succeed to the office of chairman.

The proposition was carried unanimously, and Mr. A. Paterson, on taking the chair, thanked the members for electing him and promised to do his utmost during his year of office in the interests of the institution. He, too, had an open mind as regards amalgamation, although he was convinced that unity would be to the best interests of the profession. The whole question depended upon the arrangements that could be made. The institution could stand alone, and he felt sure that they would go on to greater things when the war was over.

Mr. A. Harford-Stevens was, on the proposition of Mr. A. W. Broker, seconded by Mr. Unwin, elected vice-chairman of the district.

Many glowing tributes were paid to valuable work done by Mr. Penwill during his year of office, and he was unanimously re-elected hon. district secretary.

Mr. John Bailey was, on the proposition of Mr. Unwin, seconded by Mr. Harford-Stevens, nominated by unanimous vote as a vice-president.

The arrangements for further meetings were left in the hands of Mr. Penwill and Mr. Wyand.

Mr. Wyand, at the special request of the chairman, made a short statement regarding the affairs of the institution generally. The financial position was, he said, in a most sound and satisfactory condition, and the present month's income had already exceeded three times that of the corresponding month of last year. Membership was going up by leaps and bounds, and the current quarter would result in the addition of over 100 to the roll. He mentioned the fact that the appointment of coal overseers now being a paid one, many clerks, and not a few councillors, were obtaining the posts which by right, and on the recommendation of the Coal Controller, belonged to the surveyor, and he had written a letter of protest to the Coal Controller on the matter.

After the adjournment for lunch a visit was paid to the sewage disposal works and pumping plant of the town, and later to Ascoughfee Hall and Gardens. Time did not allow of the completion of the programme, and the inspection of the council's housing scheme had to be deferred until a future meeting.

On arrival back at the town, members were kindly entertained to tea by Mr. Bailey.

OXTED MEETING PROGRAMME.

A meeting of the Southern District of the Institution of Municipal Engineers will be held at Oxted on Saturday, August 10th. The members will assemble at 1.30 p.m. at the offices of the Godstone Rural District Council. Following the election of chairman and hon. district secretary, and the nomination of district vice-president, papers, entitled "My Evidence at the Departmental Committee on Building By-laws," by Mr. T. C. Barralet, surveyor to the Godstone Rural District Council, and "Roads in War-time and the Aftermath," by Mr. G. E. Crowter, highway surveyor to the Godstone Rural District Council, will be presented. Subsequently a visit will be paid to the council's municipal cottages at Limpsfield Chart, erected during the war.

SOUTH-EASTERN DISTRICT.

A South-Eastern District meeting will be held at Aylesbury on Saturday, August 24th. Members will visit the sewage disposal works, corporation depot, public baths and electricity works. A paper, "Aylesbury and its Municipal Works," will be presented by Mr. W. H. Taylor, the borough surveyor. Full programme will be issued later.

Military and Road Control.—At a meeting of the Notts County Council on Tuesday last, Lord Galway called attention to the protest which had been entered against placing roads and bridges under military control where construction and maintenance are concerned, and said there was a strong feeling that the military authorities, although very zealous, were not sufficiently acquainted with the construction of roads.

Institution of Municipal and County Engineers.

MEETING AT STRETFORD.

The Institution of Municipal and County Engineers held a meeting in the North-Western District on Friday and Saturday, July 19th and 20th. The business meeting was held in the Seymour Park schools on the first day. Mr. T. W. A. Hayward, M.INST.C.E., borough engineer of Battersea, president, was in the chair, and among the numerous company present were Messrs. Ernest Worrall (Stretford), William Clough (Audenshaw), Henry Yarwood (Rochdale), R. Burslam (Congleton), H. E. Denham (Tilbury), G. W. Lawson (St. Annes-on-Sea), W. M. Shimmin (Middleton), Thomas S. Picton (Eccles), Samuel Hague (Dukinfield), Thos H. Bell (Ramsbottom), H. Gilbert Whyatt (Grimsby), Wm. Spencer (Bury), George H. Wild (Littleborough), T. W. Burnett Gent (County Lancs), W. C. Persey (Barrow), S. S. Platt (Rochdale), Joseph Swarbrick (Manchester), A. T. Goeseman (Blackburn), J. H. Walters (Congleton), V. W. Laithwaite (Turton), R. H. Winterbottom (Irlam), Chas. Brownridge (Birkenhead), Robert W. Johnston (Birkenhead), H. W. Corrie (Lr. Bebington), W. Holt (Sale), Andrew M. Ker (Warrington), J. A. Settle (Bury), J. P. Spencer (North Shields), W. H. Travers (Wallasey), Ernest E. Stiven (Whitehaven), W. Bentley (Bolton), Jas. Openshaw (Salford), D. J. Diver (Marple), A. M. Scott (London), O. Hellewell (Manchester), J. W. Wiles (Manchester), C. Chambers Smith (London), S. C. Baggott (Macclesfield Borough), Norman Scorgie (Hackney), Frank Massie (Wakefield Rural), H. Goodfellow (Southport), W. Harold A. Court (Leieester), Robert R. Jones (Milnrow), A. J. Price (Lytham), G. A. Waite (Ilkley), T. H. Hartley (Colne), J. B. Wilson (Cockermouth), Frederick Hill (Lancaster), E. Picker (Beverley), R. Curtis Cordon (Bueklow), W. Plant (Stafford), Henry Entwistle (Swinton and Pendlebury), Arthur E. Collins (Norwich), G. Herbert Bayley (Manchester), and J. W. Dudley Robinson (seeretary).

At the opening of the proeeedings Mr. T. B. Finney, chairman of the council, attended, and offered the members a most hearty weleome. The council recognised the great advantages whieh were to be gained by regular meetings of such an institution, as they enabled members to interehange ideas on the many problems connected with municipal engineering. The engineers played an important part in civie life, and they could not do better than consult each other and compare notes.

Councillor Bates, chairman of the Education Committee, also weleomed the institution, and spoke of the high value of conferenees to the members of the institution and to the authorities they represented.

The President thanked the chairman of the council and Councillor Bates for the hearty welcome they had given to the institution. Their meetings were of so much value to the members who attended and to the authorities which they represented by the knowledge which the engineer gained of what was being done elsewhere that he considered it only fair that the eouneil should pay the expenses of their engineer in attending these meetings. The excellent paper of Mr. Worrall, the surveyor, was a record of the progressiveness of the district.

PUBLIC WORKS OF STRETFORD.

Mr. C. Brownridge (Birkenhead), in moving a vote of thanks to Mr. Worrall for his paper*, said the question of storm-water provision in sewers was a very difficult one, and was enhanced when they had not a number of open watercourses. Many districts had a number of streams into whieh they could divert the storm water from their sewers. Stretford was very similar to Birkenhead, and he thought it would be a good thing if a recording rain-gauge could be installed to show the amount of rainfall which fell within a limited time. In the past their rainfalls had been given on the amount of rain for twenty-four hours. If they had a recording rain-gauge they could show their authority just what happened and the result. With regard to town planning, he envied Mr. Worrall in having only one landowner to deal with. The example of Stretford was the clearest evidence that town planning was not only in the public interest but in the landowner's interest. With regard to housing, Stretford had gone in for the self-contained house and the two-storeyed flat. He was rather sorry to say the housing tendeney was to get back to the large flat—what he termed the warehousing of the people. The large flat or tenement dwelling gave the architeet more scope for statuesque design. The consequence was that the appearance of those houses more appealed to the ordinary public. But they had to think that housing was carried on for the welfare of the people. If they had a three or four storeyed flat and they were expeeting people to take children up those storeys three or four times a day and drag perambulators up those steps three or four times a day they were not planning houses in the interests of the nation. The ideal was the self-contained house. He had in his district a few three-storey dwellings that were put up as an experiment. If he had anything more to do with housing, unless there were strong reasons which called for a three or four storey dwelling, he should advocate the limitation to a two-storey house. He did that in the interest of the people who were going to occupy the houses, and also in the interest of the future generation. When some few years ago he was on the Continent—and they could not help learning even from their enemies—an eminent housing reformer in Germany warned him very strongly that England should not be led away by statuesque streets if it meant the introduction of tenements. He said: "I aseribe a great deal of the evils of the German nature to the faet that the majority of the people live in tenements. We envy your English self-contained houses, and I honestly believe if we could only get that principle introduced into Germany we would do away with a great deal of the evils which exist at the present time." Perhaps the reason why this awful war was running its course was that the majority of the Germans lived in tenements, and he hoped that a return to different and better housing would bring them back to reason. He congratulated Stretford upon its self-contained houses.

Mr. S. S. Platt (Rochdale), who seconded, agreed as to the value of the recording rain-gauge, but they wanted a lot of looking after to see that they were right. A disadvantage at the present time was that they could not get them repaired. Any authority where there was a liability to floods would find them very useful when there was a claim. He congratulated the council and Mr. Worrall on the widening at Edge-lane. It was a nice piece of work and the amenities had been preserved. He would like to know with the widening of the Longford canal bridge whether the traffic was continued without interruption. The cost of £3,300 was very reasonable.

Mr. Norman Scorgie (Hackney) also referred to the necessity of having a recording rain-gauge. Only that week one had stood him in good stead. He supposed most of them had seen in the public Press reports of the severe storm which took plaee in London on Monday, the 15th inst. In a short period of time 1⅔ in. of rain fell. With an ordinary rain gauge that would be the rainfall of twenty-four hours, but the recording gauge showed that 1 in. fell in eighteen minutes. He had unfortunately hundreds of basements flooded as a result of the storm; but he was able to show that, in the parlance of the law, it was an act of God. He was glad to see the tree planting in Stretford; it improved the amenities of the district and undoubtedly added to the health of the inhabitants. As to the council's housing seheme, the rents were exceedingly low. He was sorry there was no mention of salvage of materials of all sorts whieh came from the house refuse. There was a very large amount of revenue to be obtained if the salvage of these waste materials was worked properly. The National Salvage Council were urging authorities to take such work in hand, not only in the interest of the neighbourhood but of the nation, whieh wanted the various commodities at the present moment.

Mr. H. Gilbert Whyatt (Great Grimsby) said he was thinking of developing his main sewer and outfall on lines exactly similar to those which Mr. Worrall had followed, and he was pleased to have the confirmation that his seheme was approximately on right lines.

Mr. A. E. Collins (Norwich) deseribed the widening works of the Longford bridge as almost unique. As to the difficulties from flooding, he took it Mr. Worrall had given attention to the obtaining of relief by pumping. The plants for pumping the marshes in the East of England were most effieient.

Mr. A. J. Price (Lytham) regarded the remarks of Mr. Worrall on pumping plants as most valuable to those engineers who had pumping to do. Some pumps were very costly in steam consumption, and it was well to have independent testimony on that essential matter. Mr. Worrall did not only a wise but a courageous thing in getting the council to scrap pumps of low effieiency. Laymen were inelined to think the pumps were at work and had so many years' life; they could not always look ahead in these matters. With regard to the housing seheme the eouneil was to be congratulated in having been able to put up houses for so moderate a figure; but the priee would be very different when Mr. Worrall came to carry out his housing scheme after the war, beeause owing to causes over which he had no control the cost of housing was going to be much greater. They would not

* See p. 51.

be able to build within 50 per cent of the price of pre-war times. The laying out of streets was one of the directions in which they would have to economise in the future. If they wanted cheap houses they must not have costly street works. Keep the houses as far apart as possible; but for a purely residential street where there was no through traffic they did not want a greater width than 30 ft.

Mr. W. H. Travers (Wallasey) said that Mr. Worrall's paper afforded one more illustration of the fact that the comparatively small district presented engineering and other features of paramount interest. Engineers realised that the importance of a district, the difficulties to be met and skilfully overcome, were by no means proportionate to the population or to the area of the district. There were in Stretford many engineering works which reflected the highest credit upon Mr. Worrall as engineer and upon the council as local authority. He noticed that Mr. Worrall laid emphasis upon preserving the amenities of the district, and he could say that none of his work had given him greater satisfaction than the creation of parks and promenades. He did not think the public sufficiently realised the importance to be attached to the growth of trees in streets.

Mr. A. T. Gooseman (Blackburn) said the council's housing scheme had been carried out cheaply and the houses were let at low rents. They had provided baths with sprays which were a failure and they had had to put in slipper baths. He thought they might get a smaller bath in which a person could sit. Personally he considered for paving a 4-in. granite sett was better than a 3-in. sett.

Mr. A. M. Ker (Warrington) said the town-planning scheme was not very elaborate as to the width of roads; but Mr. Worrall had not given them an idea of what he intended to do with the building line—whether a set back had been agreed upon. He would like to ask whether the asphalt roads were slippery?

The President remarked that the paper had produced a good discussion. He could answer the question of Mr. Ker. He had had the pleasure of inspecting the asphalt roads, and if the members would do so he thought they would come to the conclusion that they were not slippery.

The vote of thanks having been accorded,

Mr. Worrall, in acknowledgment, said he was deeply grateful for the vote of thanks and the kindly expressions of those who had taken part in the discussion.

VISITS.

The members then proceeded to make an inspection of the various works described in the paper, including the Longford bridge widening and the housing scheme.

Before leaving for the visits the members were the guests of Mrs. Finney, wife of the chairman of the district council, at afternoon tea, a thoughtful hospitality which was much appreciated.

In the evening the president and members of the institution were the guests of the chairman of the Stretford District Council (Mr. T. B. Finney, J.P.) at a dinner held in the Grand Hotel, Manchester. Mr. Finney presided.

On the following day the members were afforded the opportunity of inspecting the extensive engineering works of the Ford Motor Company and the British Westinghouse Company. At the latter works the visitors were entertained to light refreshments. On the motion of the president the company were thanked for their hospitality, and the vote was acknowledged by Mr. H. Mensforth, general manager.

City of London War Bonuses.—The City of London Corporation have adopted the Civil Service scale of war bonuses. Salaries not exceeding £260 will be increased by 15 per cent, and those not exceeding £350 by 12 per cent, and those not exceeding £500 by 10 per cent.

Midlands Electric Power Bill.—The Select Committee of the House of Commons have passed the preamble of the Shropshire, Worcestershire and Staffordshire Electric Power Bill, the main part of which enables the promotors to link up their system with the undertaking of the Birmingham City Council.

Road Upkeep in Essex.—The county surveyor of Essex, Mr. P. J. Sheldon, in his annual report, states that the main roads (exclusive of claimed main roads) had cost for upkeep and improvements £127,657, and, allowing for sundry receipts, there remained a nett expenditure for the year of £123,895. The continuance of the war had rendered the upkeep of the roads in anything approaching a fair condition a most difficult problem. Efficient labour had been greatly reduced, granite supplies had been controlled, whilst team labour in the ordinary sense had almost ceased to exist, and the only really satisfactory point in the situation was that, considering the heavy military strain many of the principal roads had been and were subjected to, it was remarkable that they were not in a much worse condition. In his opinion a great deal of unnecessary damage had been done to road surfaces through the excessive speed at which Army motor-lorries were driven, both loaded and empty.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

RECONSTRUCTION AND MAINTENANCE OF ROADS AFTER THE WAR.

To the Editor of The Surveyor.

Sir,—During the past year there has been a considerable amount of correspondence in the Press on this question, and various criticisms and suggestions have been made, but with all respect I venture to suggest that the persons who have taken the matter up are either interested commercially or are laymen without practical experience.

The question is a national one, and will have an important bearing on the success of many trades in the future, and in the consideration of any schemes due regard will have to be paid to the commercial requirements.

It would appear from the views expressed by some critics that the authorities now in existence have failed to meet the requirements, and are not competent to deal with the question successfully at the termination of the war.

I would like to put up a few questions:—

(1) What is the cause of the present condition of the principal roads in this country?

(2) Is it a fact that the roads have collapsed?

(3) Subject to the necessary ways and means being provided, are the present authorities competent to carry out the important work that will be necessary at the termination of the war?

The answer to No. 1 is simple to anyone who has been connected with the maintenance of roads. During the period of the war a gradual starvation has been proceeding in consequence of the inability to obtain the necessary material and labour; therefore it has only been possible to concentrate the strength on those roads taking the heaviest traffic.

With regard to No. 2, I submit that the roads have not collapsed, except in a few cases where the traffic has been of an extraordinary nature, either naval, military, timber, or munitions. Generally the roads have stood the strain in a remarkable manner, which speaks volumes for the sound work carried out in the past.

As to No. 3, I respectfully suggest that, subject to the necessary funds being forthcoming, and the return of the various members of our staffs who are now engaged overseas, the existing authorities are quite capable of dealing with the situation.

At the time of the outbreak of war a number of county councils had extensive reconstruction schemes in progress in conjunction with the Road Board. The value of this work is quite apparent to-day where the roads are taking very heavy traffic, and the surfaces are still in excellent condition.

It must not be forgotten that the authorities have released the younger members of the staffs to join the Forces, and in particular the Road Construction Army, under the direction of Brigadier-General H. P. Maybury. On the cessation of hostilities the majority of these men look forward to returning to their old positions, which are being kept open for them, and although it has recently been suggested that the necessary reconstruction work in this country should be taken over by General Maybury and his present staff, as an old county surveyor I do not think for one moment that he would wish to supersede the positions of his former colleagues who have been "carrying on" in this country under exceedingly difficult conditions. Every surveyor appreciates the excellent work that General Maybury has done, and there is no reason why the good feeling that existed prior to the war between the Road Board and highway authorities should not continue in the future.

It is true that in the past there has been a multiplication of highway authorities, which might be improved upon by reducing them to one combined authority in suitable areas. This is a question of principle. As a county surveyor, it may be said I am not an uninterested party, and for that reason perhaps it is not wise for me to put forward any definite proposals. I do hope, however, that some credit will be given to those authorities and members of the profession who have been carrying on in this country during the period of the war under most trying conditions, and that when the time comes to deal with important schemes they will have an opportunity of showing what they are capable of doing.—Yours, &c.,

C. F. Gettings, M.Inst.C.E.,
County Surveyor, Worcester.

July 26, 1918.

The Price of Horses.—The Corporation of London has just paid £1,290—a record price—for seven horses.

"The Surveyor" Book Department.—Readers of "The Surveyor," especially those serving with H.M. Forces, who experience difficulty in obtaining scientific and technical books are invited to send particulars of their requirements to the manager of "The Surveyor," Book Department, 24 Bride-lane, Fleet-street, E.C. 4.

Sewage Disposal.

By EDWARD WILLCOX, M.INST.C.E.*

Owing to the restrictions which have been placed upon the execution of public works which are not essential for the carrying on of the war, constructional work in connection with schemes of sewage and sewage disposal has been more or less at a standstill during the past year, except that required for military purposes in connection with camps and munition works.

The greatest progress made in this country recently, has been in connection with activated sludge, though experimental and research work has been proceeding in connection with the treatment of trade wastes and utilisation of sewage and sewage sludge, but for the principal developments in connection with sewage disposal works during the past year or two we have had to rely chiefly on work done in the United States.

CAMP SEWAGE DISPOSAL.

The establishment of a large number of camps all over the country, and the necessity of making provision for the collecting and treating the sewage therefrom, has given rise to a difficult problem, especially in the earlier stages of the war, when there was much uncertainty as to the period of occupation, and the numbers to be provided for.

Frequently the methods adopted were only suitable for temporary camps, the fæces and urine being collected in pails and removed for disposal on the land, or dealt with by incineration. It did not appear at first to be realised that as the sullage waters would have to be dealt with, a water carriage system, and properly designed works for sewage treatment would, apart from the sanitary advantages, have resulted in much economy.

Of late the War Office has in some cases obtained the advice and assistance of experienced persons, with the result that many of the more recent sewage works in connection with camps have been constructed on modern lines, it being now realised that a large camp is practically a town, and works of a permanent character are therefore necessary.

An attempt at standardisation for sewage disposal works was made in connection with certain camps in Ireland, but although systems of drainage for sullage waters were provided, the pail system was adhered to for the excreta and urine, and instructions were given by the authorities for sewage works to be designed on a basis per head which would be too low if and when a water carriage system were substituted.

One of the considerations in designing sewage and sewage disposal works for camps where there are large units is the fact that the discharge into the sewers from latrines, baths and lavatories is apt to be in the flushes over comparatively short periods of time, so that without suitable arrangements for equalisation, expenditure may be incurred on disposal works which with them would be unnecessary. In order to keep the sizes of the water mains and trunk sewers within reasonable limits, as well as to prevent excessive rates of flow at the disposal works, it was decided that in these divisional camps the men of one infantry brigade only should be the largest number permitted to use the shower baths at one time.

Another feature is the fresh character of the sewage to be treated, so that in cases where the works are near the camps, and with some methods of treatment, it might be advantageous to use mechanical means for breaking it up before it reaches the screens and aëration tanks.

The lack of standardisation, either for sewage disposal works or sanitary appliances and arrangements, may lead to much trouble and unnecessary expense, as for instance on the transference of units from a camp where one system has been in use, to a camp where an entirely different one is in operation, with the result that alterations and changes would have to be made to meet the views of those responsible for the sanitation of the incoming unit. The sewage from all camps being much the same character with no inhibitory trade wastes, there should be little difficulty in adopting a standard system for disposal works for various units, and one would appear to be desirable for the sanitary appliances also.

FERTILISERS FROM SEWAGE.

One lesson of the war has been to emphasise the need for increasing our home production of food. This has led to considerable areas of waste land being put under cultivation, and large numbers of grass lands have been converted into arable land. The problem of obtaining the necessary amount of fertilisers has therefore become acute, and has had the effect of drawing attention to the possibilities of the utilisation of sewage and sewage sludge.

The difficulties both financial and engineering in the way of utilising sewage for agricultural purposes over large tracts of land are well-known and generally recognised.

As the small percentage of actual manurial value in ordinary sewage sludge renders the cost of its use prohibitive when it has to be transported considerable distances, attention is being directed to the best means of extracting from the sludge those constituents which are most valuable, or by the addition of certain chemicals to increase its manurial value so as to render it both a marketable and profitable proposition.

The war has brought into prominence the fundamental importance of nitrogen compounds, both for munitions and agriculture, and the world's production of food is becoming more dependent upon the utilisation of nitrogenous fertilisers.

In addition to the nitrogen contained in sewage, there is much mineral matter, the chief source of which is no doubt the detritus from the surface of the roads. This would also have chemical and physical effects upon plant life. The subject of utilising mineral matters such as granite dust has recently been dealt with exhaustively in a very interesting paper by Mr. Sampson Morgan, published in the *Fortnightly Review*.

In connection with the question of utilisation of sewage to the best advantage, some interesting work has been done at Croydon Sewage Farm during the last two years by Mr. J. E. Farmer, F.C.S. The policy adopted there is based on the principle that the solid matter in sewage deposits more nitrogen than mineral fertilisers. This being so, the soil new to sewage treatment would have a balance of mineral salts, and with the help of nitrogenous manure would produce heavy crops at first.

If, however, owing to the long continued application of sewage, the nitrogen is added at a greater rate than its depletion by cropping, and without a corresponding increase of the mineral matters, which are also depleted by cropping, the soil eventually becomes out of balance for heavy crop production. The operations at Croydon which consisted of the application of artificial fertilisers, lime, basic slag, &c., in order to restore this balance, resulted in doubling the yield, and has been financially successful. I believe this is the first sewage farm where a systematic and scientific use of artificial fertilisers has been tried to restore the balance of mineral and nitrogenous matters in the soil.

DESIGN OF PLANTS.

Such great advances have been made in the disposal of sewage during the past decade, that it may be said a modern sewage works properly designed and constructed can be made capable of effecting any reasonable degree of purification, provided of course that there are no excessive quantities of inhibitory trade wastes, but there is still ample scope for research and investigation in connection with the principles involved relating to the correct design of plants for the various stages of the process.

In very few works is there any complete and proper method for measuring the amount of sewage treated. This is a matter of first importance, for otherwise the rates of flow through tanks and on to filters cannot be determined, and there are no means of ascertaining whether unsatisfactory results are due to the overloading of parts of the works or to improper methods of operating.

Many plants are designed with ample capacity, but without a sufficient number of both detritus and sedimentation tank units, with the result that they have not the elasticity which is necessary to deal to the best advantage with varying sewage flows. Detritus chambers should be in duplicate with proper means for emptying, and so constructed as to retain only heavy mineral matters, permitting the lighter organic matter to pass through. This again brings into consideration the question of velocity of flow through these tanks, and the desirability of providing them of sufficient capacity and in suitable units.

The question of the best means of drawing off sewage sludge from tanks with a minimum of supernatant water is also one of great importance.

As a result of the Milwaukee experiments, Mr. Chalkley Hatton states that removing the sludge by hydrostatic head has the advantage of producing a thicker sludge, and he points out that this method of draw off can be satisfactorily regulated.

WOLVERHAMPTON EXPERIMENTS.

I should like to take this opportunity of referring to the experiments recently carried out by Mr. Wm. Clifford, M.INST.C.E., of Wolverhampton, in order to determine the type of tank best adapted for sedimentation of sewage, and to prevent the short circulating and eddies which all who have tried by means of a colour test to time the passing of a liquid through a tank have no doubt observed.

The underlying principle of Mr. Clifford's experiment is to dissipate the energy of the incoming sewage, and bring it to rest in the shortest possible time, to prevent eddies, and to

* Presidential address to the Association of Managers of Sewage Disposal Works.

ensure that all the sewage received into it should remain for an equal period of time in the tank.

The large number of exhaustive experiments carried out were of remarkable interest, and resulted in the design and construction of the sedimentation tank used in connection with the activated sludge system at Withington, Manchester, which so admirably fulfils these functions, notwithstanding the fact that activated sludge contains much flocculent matter, and is particularly sensitive to any variation of rate of flow, or increased velocity due thereto.

Briefly described, this tank is of the Dortmund type, its essential feature being in the method of feeding adopted. The sewage passing down a central pipe is discharged into a circular vessel of somewhat larger diameter. Outside this a guard chamber is constructed, the dimensions of the tank, the vessel and the guard chamber are so proportioned that eddies are prevented, and the energy of the incoming sewage is effectually dissipated.

Passing on to the consideration of percolating filters, there are many points which need to be further investigated in connection with these with a view of ascertaining how far and in what way it is possible to reduce their cost and increase their efficiency.

AMERICAN RESEARCH WORK.

Mr. H. W. Clark, Director of the Massachusetts State Board of Health, has recently carried out at the Lawrence experimental station some notable research work with filters of varying depths, and the results he obtained showed that trickling filters of a considerable depth were more efficient than shallow ones, the efficiency being due to the fact that the sewage is relatively a much longer time passing through the deeper filters, and the deeper the filter the greater the tendency of the applied water to mix with the held water, instead of pushing by it, this tendency increasing with the depth.

With equal rates of application the sewage was five or six times as long passing through a 10-ft. filter as through a 5-ft. filter. The higher rates at which these deeper filters could be operated were directly proportional to this increase in time, so that it was possible to increase the dose on the deep filters to that of five or six times the shallow filter, and obtain equally good purification.

If it could be established by experiments on a large scale that a filter 10 ft. deep was capable of dealing permanently with a volume three or four times that which can be treated on a 5-ft. filter, the saving in initial outlay on works might in many cases be considerable, but would of course depend upon the local conditions, such as whether sufficient fall was available, or pumping necessary, also the character of the subsoil, as these conditions may so increase the cost of construction and working expenses as to render it more economical to put down a larger area of shallow filters.

Given a properly designed and constructed filter bed, whatever the depth, with suitable media, its efficiency will largely depend upon the method of distribution which is adopted.

DISTRIBUTION OF SEWAGE.

In 1904 I read at a meeting of the Sanitary Institute at Glasgow a paper on "The Importance of the Uniform Distribution of Sewage on Filters," and I see nothing to alter the views I then expressed, viz.: that in order to ensure efficient distribution it is necessary that the liquid should be discharged over every portion of the filters in uniform quantities, and at regular intervals of time, and that the distribution should be arranged so that these conditions may be under complete control.

Distribution can best be effected by a power-driven distributor travelling along a rectangular filter bed fitted with arrangements for regulating the discharge of sewage on to the filter, and which delivers the sewage in an unbroken film by means of large nozzles and fan deflectors.

(To be concluded.)

Pig-keeping in London Parks.—The London County Council Parks Committee have decided not to grant application for sites for the keeping of pigs at parks and open spaces, as they are advised that, under the amended regulation, the owner of any piggery established at those places would obtain a right to use the site for the purpose for at least five years.

Economy in Street Lighting.—The Commissioner of Police has addressed a letter to the metropolitan boroughs stating that, with a view to securing further economy in the consumption of coal, it has been agreed, as an experimental measure, that street lighting in Inner London may be reduced to the extent of 50 per cent of the pre-war lighting, providing that the reduction is spread equally over both main and side streets. It is also suggested that the lighting of lamps should be commenced later and the extinguishing earlier than at present, provided that the majority of the lamps in the more important thoroughfares are in lighting between one hour after sunset and two hours before sunrise during the summer period.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is it not little short of a scandal that whereas the Kerry County Council are offering £150 a year for an assistant county surveyor, who has to be a thoroughly qualified civil engineer, the Thurrock, Grays and Tilbury Joint Sewerage Board have decided to appoint a pump-driver at £3 a week, or at the rate of £6 a year more than the salary offered for an educated, well-trained surveyor ?

* * * *

Was it not a good suggestion of a Mr. F. Howard Ames, of Whitby, Ontario, at the recent Canadian Good Roads Congress, that there was an opportunity of perpetuating the memory of the brave men who have fallen in the war by the construction of:—

"Ontario Glory Roads, given, through their government, by the grateful people of that province, in honour of its sons, the Heroes of Canada, who freely gave man's greatest gift, Life, that liberty, freedom and justice might not perish throughout the world."

Would not such memorials find greater favour in this country than any number of statues or other *objets d'art* ?

* * * *

Is it not evident that the sewage works of Columbus, United States, will have to be extended or reconstructed, when we read that the 5 ft. 6 in. deep filter beds are being dosed at the rate of nearly 2½ million gallons per acre—which is equivalent to about 278 gallons per cubic yard ? Is it to be wondered that the effluent from these works is far from satisfactory, and that a considerable extension of the area of filter beds is contemplated ?

* * * *

Is it not to be hoped that during Mr. Hayward's presidency of the Institution of Municipal and County Engineers there will be a boom in the Orphan Fund of that institution ? Did he not, in his remarks at the annual meeting, emphasise the importance of a more widespread support of this excellent fund, and may it be expected that by the end of his year of office at least one half of the members will have become subscribers ?

* * * *

Will not one of the most burning questions of the day, when the matter of reconstruction after the war comes to be seriously considered, be: "Who is to pay for the cost of reconstruction of our roads and their maintenance in the future" ? Will the cost be borne by the taxpayer out of what are called State funds, by the local ratepayers, or by the user of the roads, or met by the petrol tax, or by all four of these sources of revenue ?

* * * *

Is it not evident that the question of public street lighting will require careful revision after the war ? Should not spacing of the lamps be carefully considered on the basis of the law of light diminishing in proportion to the square of the distance, and has not experience shown that diffused light is better than strong points of light ? Should not the lamp standard be ornamental as well as useful, and is it better to have single globes or clusters ? These and many other questions require careful consideration, and is it not to be hoped that a better study of the lighting question will be forthcoming, instead of the haphazard methods of the past ?

* * * *

Does not the menace of a military control of our roads loom rather large when we see that the Press is taking up the subject ? Is it not time that the council of the Institution of Municipal and County Engineers bestirred themselves and declare emphatically for either Codlin or Short ? If there are any serious laxities in the present system of road control, could not this be altered without such a drastic change as appears to be now contemplated ? Should not the council of the institution also ask for representation on the transport boards which are being formed all over the country, so that they can keep in touch with a movement that may seriously affect the road question and the class of traffic which the roads may be called upon to bear ?

Road Maintenance in Aberdeenshire.—In his annual report, Mr. George S. Barry, surveyor for the First or Deer District of the county of Aberdeen, states that work has been carried on with increasing difficulty, owing to the extreme shortage of labour and the consequent want of sufficient materials. The road staff has gradually been depleted until at the present moment the work is being carried on with barely one-third of the normal number of workmen. Speaking generally, however, the roads of the district are in very fair order. There are, of course, exceptions where roads have been weakened and damaged by timber and Admiralty traffic. This is particularly apparent where haulage has been carried out by traction engines and heavy petrol-driven vehicles. Where excessive wear has taken place, it is almost entirely due to these vehicles being driven repeatedly in the same tracks and no endeavour made to break wheel gauge.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week. Other reports will be found on our "Local Government Board Inquiries" page.

BUILDINGS.

Berwick T.C.—The Sanitary Authority are making inquiries as to the cost of expert opinion on the construction of an isolation hospital.

Notts C.C.—The council decided on Tuesday last to purchase property at a cost of £12,000 for the extension of the Shire Hall, Nottingham.

Sidmouth U.D.C.—The Local Government Board have refused to sanction a loan for the provision of an infectious diseases hospital, whether temporary or permanent. They point out that Sidmouth is already in the county council scheme for a joint hospital.

REFUSE COLLECTION AND DISPOSAL.

Bethnal Green B.C.—A report on the working of the scheme for the salvage of waste materials for five months to June last shows that the receipts were £555 and the expenditure £342, showing a profit of £213. The amount paid to dustmen in addition to ordinary wages was £221 8s. Among the materials salved were about 70 tons of waste paper, rags and gunny broken glass, bones and old iron. The collection of these materials has reduced the weight of house refuse to be disposed of by 66½ tons, and effected a saving thereby of approximately £11 2s. 9d.

ROADS AND MATERIALS.

East Sussex C.C.—With respect to the contribution towards the cost of maintenance, &c., of main roads, all the urban authorities have agreed to accept the terms of the county council. Respecting the tarring of main roads in urban districts, the county council have agreed to rescind the resolutions passed in February last. It was decided that, as from April 1st the tar surface treatment of main roads in urban districts be treated as maintenance and repair, towards which the county council would contribute the usual 90 per cent and 5 per cent. of the cost on approved estimates.

Hounslow U.D.C.—The surveyor, Mr. T. Carey, has forwarded to the Ministry of Reconstruction the following list of road works which it is proposed to carry out after the war:—Resurfacing of the Bath-road; wood-paving of the haunches of the Staines-road outside the tramway tracks; completion of the Heston-road improvement; completion of the Twickenham-road improvement between Isleworth fire station and Ivy Bridge.

Londonderry C.C.—It was reported that the Local Government Board had refused to sanction the payment of bonuses to a number of contractors in the Limavady district owing to the greatly increased cost of labour and materials. The Finance Committee expressed sympathy with the contractor and referred the matter back to the Limavady Council for further information.

Notts C.C.—The Road Board scheme of 1914, comprising the resurfacing of 90 miles of rural main roads in Notts, has now been completed. The estimated cost was £96,540, or at the rate of £1,072 per mile, but the actual cost was £106,040 or £1,178 per mile. The Road Board have intimated that they will be prepared to make an additional grant of £3,598 towards the increased expenditure. They have also intimated to the Highways Committee that they are prepared to contribute £2,050 towards the estimated expenditure of £2,459 required to reinstate main roads damaged by the haulage of timber.

St. Germans R.D.C.—The sanitary inspector has been appointed surveyor in the absence of Mr. Foster. It was reported that a satisfactory arrangement had been made with the engineer inspector of the Road Board respecting claims of over £2,000 for the repair of roads damaged by traffic.

West Sussex C.C.—The Roads and Bridges Committee reported that the Road Board had agreed to pay £1,000 towards the repair of the main road from Chichester to Tangmere. With regard to the work of the county surveyor, Mr. H. W. Bowen, for the Road Board it was explained that the board proposed to pay the county surveyor a lump sum down when the work was completed, and that course had been approved. The council, Lord Leconfield added, would be glad to know that the Road Board were very pleased indeed with the way in which Mr. Bowen was carrying out the work he was doing for them.

SEWERAGE AND SEWAGE DISPOSAL.

Hounslow U.D.C.—The council have reported to the Ministry of Reconstruction that it is intended to carry out work in connection with the Great Western-road foul sewers after the war.

Marylebone B.C.—It is proposed to construct a sewer in Hamilton-gardens, at an estimated cost of £130.

Reeth R.D.C.—A committee has been appointed to consider a scheme for the improvement of the sewage disposal works.

Westhampnett R.D.C.—Subject to the sanction of the Local Government Board, the council have agreed to pay £100 to Mr. Howard Humphreys, the council's engineer, for services in connection with the Selsey sewerage scheme adopted in 1914 which was not proceeded with owing to the war.

Windsor R.D.C.—With reference to a threatened legal action over the Sunninghill and Sunningdale drainage scheme (which was stopped on account of the war), it was announced that the points at issue had been settled by an agreement to pay the contractor £500, which includes all damages and costs.

WATER, GAS, AND ELECTRICITY.

Birmingham T.C.—The Board of Trade have sanctioned the scheme for the new permanent generating station. The total estimated cost of the works involved is £1,500,000.

Bristol T.C.—The city council have adopted an estimate of £91,000 for electrical extensions.

Glasgow T.C.—The profit of the electricity undertaking last year was reported to be £7,145.

Haverfordwest T.C.—The borough surveyor, Mr. W. Bevan, has received instructions to proceed with the relaying of certain gas mains, at an estimated cost of £460.

Leeds T.C.—It is proposed to increase the charges for the supply of electricity by 40 per cent.

Linlithgowshire C.C.—Owing to a scarcity of water in their district, the Linlithgow District Committee have made arrangements with Edinburgh Water Trust for a supplementary supply. In order to obtain this supply the district committee have decided to lay a 6-in. pipe from their Morton reservoir to the Edinburgh water main at a point above Harper-rig, at an estimated cost of fully £4,000.

Merthyr T.C.—An amended estimate, amounting to £6,700, has been submitted by the engineers for concreting the trench in connection with the Taf Fechan reservoir scheme.

Norwich T.C.—It was stated that after the war it would be necessary to make very considerable additions to the machinery at the electricity works in order to provide, not only spare plant now lacking, but also for further developments. This may involve a large outlay not immediately remunerative.

Rugby T.C.—It is proposed to adapt the Diesel engine at the waterworks for the use of tar oil, at an estimated cost of £400.

Sedgley U.D.C.—The Gas Committee reported that the deficit of £432 on the previous year's working of the undertaking had been converted into a nett profit of £1,130, but the price of gas had to be increased by a further 6d. per 1,000 cub. ft., and for ordinary lighting purposes had now reached 4s. per 1,000, in place of 3s. in normal times.

Waterford T.C.—A scheme has been adopted for the provision of a supplementary water supply.

Welshpool T.C.—The town council are to be asked at the next meeting to take steps to provide an adequate water supply for the town.

MISCELLANEOUS.

Richmond (Surrey) T.C.—The town council have refused sanction to a proposal to erect pigsties on a site in the vicinity of the County School for Girls, which was stated to be 140 ft. distant from the building, and have alternatively approved a scheme for the erection of eight sties on some other site to be approved by the council.

Wivenhoe U.D.C.—It was reported that at a special meeting of the council Mr. R. M. Barrell, the surveyor, tendered his resignation, but that after the council had passed a vote of confidence and expressed the hope that they would retain his services, Mr. Barrell decided to withdraw his resignation.—The Finance Committee recommended that Mr. Barrell's salary be increased by £15 per annum, making the salary £20 in respect of the office of surveyor and £45 in respect of the office of sanitary inspector. This was carried.

Business Announcement.—Messrs. Broom & Wade, Limited, Desborough Ironworks, High Wycombe, Bucks, announce that their works will be closed from August 5th to 10th, inclusive. No goods can be received or despatched during that period, but a small staff will be in attendance to deal with urgent correspondence.

PERSONAL.

Mr. F. J. Wood, county surveyor of East Sussex, has received a war bonus of £150 a year.

Mr. J. Johnston, waterworks engineer of Brighton, has had his salary increased by £100 a year.

Mr. R. J. W. Layland, surveyor to the Billericay Rural District Council, has been appointed local coal inspector.

Mr. W. L. Underdown, of Thorp St. Andrew, has been appointed surveyor to the Blofield Rural District Council.

Mr. Glynn-Warne, surveyor and engineer to the Kingswood Urban District Council, has been appointed local fuel overseer.

Mr. R. Stuart Pilcher, manager of the Aberdeen tramways, has been appointed manager of the Edinburgh tramways undertaking.

Mr. N. D. Keston, surveyor to the Mayfield Rural District Council, has been appointed to act as fuel overseer at a salary of £70 per annum.

Mr. A. L. Grant, surveyor to the Wycombe Rural District Council, has had his salary increased by £50 a year, making it £215 per annum.

Mr. J. F. Delaney, city surveyor of Cork, has recovered from his recent indisposition, and has received the congratulations of the city council.

Mr. E. Williams, surveyor for No. 1 District of the Llandovery Rural District Council, has been appointed fuel overseer, at a salary of £50 a year.

Mr. A. A. Green, borough surveyor of Brackley, has been appointed overseer under the Coal Order, at a salary of £50, to include clerical assistance.

Mr. J. Stone, sanitary surveyor to the Sedgefield Rural District Council, has been released by the council to undertake work in France in connection with the drainage of large hospitals.

Mr. J. P. Carbis and Mr. S. Gilbert, highway surveyors to the Truro Rural District Council, have agreed to carry out the duties of fuel overseer free of cost to the council, "as it is war time, and extra work is demanded of all."

Mr. B. L. Wright, surveyor to the Holbeach (Lincs) Urban District Council, has had his salary increased from £125 to £140 per annum, and at a special meeting of the council held on Tuesday was unanimously appointed local fuel overseer at an extra remuneration of £70 per annum.

Lieutenant R. A. Harding, R.E., has been awarded the Military Cross; he had twice previously received mention in dispatches. Corporal T. Oldroyd, who has been wounded and is in hospital, is to receive the Military Medal. The former was pupil and the latter clerk to the borough surveyor of High Wycombe.

Mr. O. Claude Robson, engineer and surveyor to the Willesden Urban District Council for over forty-three years, has resigned owing to illness, and been appointed consulting engineer at a salary of £600 per annum. Mr. Robson had a share in the founding of the Institution of Municipal and County Engineers, acting as hon. secretary during the proceedings leading up to the formation of that body. He filled the office of president in the year 1898-9, since when he has been prominently associated with the building up of the Institution's Orphan Fund, whose claims he has been untiring in bringing to the notice of members.

OBITUARY.

Mr. Joseph John Knewstubb, for the past eighteen years architect, surveyor and inspector to the Penrith Urban Council, died last week, we regret to state, at the age of forty-nine. He was an associate of the Royal Institute of British Architects and a member of the Royal Sanitary Institute.

Sir John Mowlem, Bart., chairman and one of the governing directors of John Mowlem & Co., the well-known contractors, who died on February 20th, in his seventy-fourth year, left £206,453, the nett personalty being £180,932.

Sewage and Agriculture.—Answering a question in the House of Commons as to whether the Government were prepared to inquire into the whole question of utilising sewage for agricultural purposes, Mr. Hayes Fisher said he did not think the case was one in which the appointment of a committee of inquiry was justified at the present time.

Road Material Agents and Merchants: A Proposed Association.—A meeting of Yorkshire road material agents and merchants was held in Leeds on Tuesday to consider their mutual welfare, and it was decided to approach all agents and merchants in the North of England with a view to forming an association. Messrs. Newsome and Peel, of Burley-in-Wharfedale, were appointed hon. secretaries *pro tem.*, and they invite all road material agents and merchants in the North of England to write them at once.

LOCAL GOVERNMENT BOARD INQUIRIES.

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APPLICATION FOR LOAN.

Rowley Regis U.D.C.—£3,161 for laying out a cemetery.

LOAN SANCTIONED.

Sligo R.D.C.—£355 for completing the well and pump at Ranghey.

INQUIRY HELD.

Birmingham, Tame and Rea Drainage Board (July 24th. Mr. P. M. Crosthwaite).—£89,581 for works of sewerage and sewage disposal, including works in the parish of Minworth. Mr. Arnold Harris, clerk to the board, explained that the application was the outcome of a circular letter from the Local Government Board in 1916, asking to be supplied with a return of works available for execution immediately after the war. This was for an extension of bacteria beds, and the estimated cost of £89,581 was based upon the present prices of materials, &c. Mr. Liggins, representing the Meriden District Council, said that owing to its situation the district had all the disadvantages of any smells which might arise from these works without any compensating revenue. The inspector replied that that was unfortunate, but hardly a matter with which he could deal.

HOUSING NOW AND AFTER THE WAR.

Gloucester city surveyor, Mr. R. Read, has been instructed to prepare a scheme for 200 houses.

Norham and Islandshires Rural District Council propose to build fifty houses at an estimated cost of £430 each.

Glyncorrwg Urban District Council have approved a scheme prepared by the surveyor, Mr. W. P. Jones, for the provision of 320 houses under the town-planning scheme.

Birmingham City Council on Tuesday approved the report of the Housing and Town-planning Committee, embodying the principles on which it is urged the housing problem should be dealt with. It was considered that facilities should be given to the corporation to buy land without being under present disabilities. It is proposed to put proposals before a departmental committee which is to enquire into the question of assisting private enterprise. Mr. George Cadbury, jnr., the chairman of the Housing Committee, in particular, urges the desirability of promoting building by public utility societies. He says if powers can be obtained to this end, if they can persuade the Government to bring the operation of such societies within their scheme of subsidies, he is of opinion that there will have been accomplished one of the greatest reforms in housing it would be possible to conceive.

FOR OTHER ADVERTISEMENTS
See End of Paper.

CITY OF WESTMINSTER.
Wanted (probably for the duration of the war) in the offices of the City Engineer and Surveyor, temporary Civil Engineering Assistants, with municipal experience, at a salary of £4 9s., including war bonus, per week. Also wanted, a temporary General Clerk of Works, at a salary of £4 9s., including war bonus, per week. Applicants, who must be ineligible for Military Service, should send particulars of their experience to the undersigned.
J. W. DUGDALE-BRADLEY, M.Inst.C.E.
City Hall, Westminster, W.C. 2. (3,839)

BERREY MAYOR.

BOROUGH OF GRAVESEND.
Wanted, a Driver for the Borough Motor Ambulance. He must be capable of removing infectious cases, disinfecting premises, testing drains, &c. Wages, £3 per week. Application to be sent to the undersigned on or before Thursday, 8th August, with not more than three testimonials.
H. H. BROWN,
Town Clerk.
July 31, 1918. (3,840)

DUMPY LEVEL WANTED, 10 in. or 12 in. Must be in good condition and complete with tripod.—Full particulars to Dressler Tunnel Ovens, Limited, Stoke-on-Trent.
(3,841)

Roads During and After the War.*

By E. PURNELL HOOLEY, Oxford.

With the pre-war facilities, one looking back to the state of affairs thirty-five years or more ago cannot but be struck with the progress of road maintenance up to 1914, but the period since passed through also brings back many of the troubles, difficulties and conditions that so many years ago did not seem to so frighten one then as may be they will at present. The hope is ventured that mentioning a few of the author's dealings with roads years ago which seem applicable in a measure to the present conditions may be useful, at any rate to the younger members of the institution, without needlessly giving offence to those who are always too wise or too old to learn from others.

The taking away of 75 per cent of the available steam rollers, traction engines, self-propelled tractors to another sphere of usefulness in great measure returns the surveyors to the days of the Victorian era. The difficulty of obtaining road material equally returns them to the days when each member of the old Highway Board begrudged the necessary material for efficient management because "the roads were good enough for farm traffic," and to those "wise men" "farm traffic" seemed nearly all that the roads were ever intended or likely to carry! It can hardly nowadays be appreciated that in 1881 steam rollers were looked upon by very many as the expensive toy of the amateur road-maker, or the fool's paradise tool of the enthusiastic reformer!

The modern road user has of necessity sounded the death-knell of the old roller scoffer and snubber, but the roads, the traffic, the grumblers, the wearing out and the amateur cure-all are still here, and seemingly likely to remain.

In districts where roads have once gone through a period of improvement, everyone of common sense must appreciate that great effort must be made by modern road engineers to minimise the undoubtedly backward step that has lately had to be endured through causes no one less than Britishers have brought about, though few will have, mercifully as they have, more silently suffered.

Alas! in very many counties the roads have gone back, and, whilst admitting the fact, it behoves the surveyors to be up and doing as soon as they can, so that the ills may be remedied, and if possible even good may come of the ill that has been wrought.

WHY ROADS HAVE SUFFERED.

It has long been appreciated that ordinary macadam roads with compulsory starvation of materials and manual labour cannot stand, and the war has only gone to prove that if better construction had been earlier attempted even the war would not have caused such destruction as has been meted out, and this is clearly shown where permanent material has been properly used.

A few counties have been so short sighted as to starve the roads and reduce the rates during the war. Those counties which have done so are certainly deserving of no pity or assistance in the future for having adopted such a short-sighted, illogical position, but will doubtless be the first to call for aid. Most counties and other authorities, it is hoped, have continued to make their rates as of old, and judiciously saved their balances, knowing full well that the time must come when the roads will again have to be placed in first-rate condition and these balances be required. It is hoped that, having learned the lesson that water-alone-consolidated roads must be placed with other passed-over "relicts of the past," more modern treatment will be allowed to show the sensible advancement with the times.

A few suggestions of how to bring this must-be-admitted sensible procedure are therefore offered.

Attempts in the last forty years have been made to improve urban or "in town" roads, and every credit must be given for what was done; but it is only in the last twenty years that any effort was made to really permanently improve the method of our out-of-town county main and district roads.

In the year 1901 the writer in a report urged his then council that water-consolidated roads must be improved upon, and was quickly dubbed on many sides as "a crank." A reference to the year of office of our esteemed past president, Mr. J. A. Brodie, of Liverpool, alone will show that so short a while ago other than water-consolidated roads were somewhat novel, and yet no sensible present-day engineer would now say he was satisfied that water-consolidated surfaced roads could be successfully made to economically and satisfactorily carry modern road vehicles for any extended period. Yet, alas! in many districts up to 1914 have they gone on without seriously attempting to stop the water-consolidated system, though even grants, doles, and almost bribes have been offered by the Road Board and others to induce better systems of a more lasting character.

The result of all is the roads are now suffering, and unless differently dealt with will more seriously suffer still when times are more settled.

Undoubtedly self-propelled traffic is yet in its infancy, and the advent of cheaper cars for light use and the great advantages of heavy and light tractor traffic for business purposes will call for permanent roads or terribly increased cost of present roads.

Now seems the time to get ready for this coming alteration, and when the ordinary traffic is not so much in evidence a great deal of useful and by the public unappreciated work can be undertaken.

Few roads have any real foundationing such as Telford (wise man!) suggested.

If roads can be gradually made in some measure on a mixture of the systems advocated by Telford for foundation, Macadam for "subcrust," with a finished surface of more lasting material presented to the wearer, all may yet be well.

It is useless to think it possible to construct a sound permanent road on 4 in. of round pebbles or ground-up granite and imagine because one is laying down 3 in. of permanent facing that a road will be constructed which will stand regular 'bus traffic and hundreds of fast-speeded motors every eight or ten hours; but this is a course many men have attempted and cursed the "surfacing" for their failures!

THE USE OF FURNACE SLAG.

If all the work now carried out can be done with a view to preparing the country main roads for permanent surfacing later, well and good, and no more useful material can be used for this purpose than a layer of sound furnace slag, in gauge about 3½ in. or 4 in. with every void carefully packed with smaller material, the whole well and efficiently rolled into one mass and laid on top of an existing surface, if the bottom is sound and dry. As furnace slag seems specially to lend itself, a "subcrust" will be presented almost ideal for receiving a permanent face, and a "subcrust" that will well carry ordinary traffic until the permanent surfacing is ready. Care must be taken that the uniform thickness as far as possible is used, and any small shaping should be done under this slag "subcrust."

Of course other—perhaps local—material may be used for this work. If the road is at all waterlogged or even has a damp foundation, a careful layer of angle-wise-laid faggots as a bottoming packed with engine ashes and steam-rolled down, then on top a layer of good coarse engine ashes or furnace clinkers laid to a 4-in. consolidated thickness, with finer ashes brushed in between the slag, limestone or other local material will give an excellent result as a base for road forming.

When the author some fifteen years ago saw this was the right course to pursue he had no war time to take advantage of, and well he remembers the unkind suggestions that he had to bear on the ground that he was starving his roads of "decent" material for the sake of making motor roads of his pet material.

Unfortunately there are always members of councils as well as the ordinary public who will not credit any work as likely to have a good result if outside their limited sphere of knowledge; but the author's advice to his younger brethren is know your duty and your work, go on and do it—you will not suffer in the end. Your conscience is more deserving of comfort than carping critics' back-patting; these seldom openly show their own failures.

Soft sides are the fault of many roads and are often caused by continual and often unnecessary siding. Now appears a time when sides can be strengthened and made the necessary abutment of all really good roads. Men will forget all roads are—or should be—arches. Who ever built a bridge with no abutment or side support? The author has proved one of the best methods of dealing with soft sides is to excavate the undesirable matter, be it sand, clay or soil, lay in a thickness of 4 in. of rolled clinkers and on top lay a course of rolled faggoting at an angle of 45 deg. to the side of the road to the desired width, fill every space up with ashes, lay a thickness of 4 in. rolled clinker again on top, and proceed with the slag, limestone or local material as before described, always taking care to remember that each layer or method requires a steam roller to consolidate the work as well as a sensible man to watch its progress, as road making is an art, not a mechanical process, that requires life to administer and guide it if satisfactory results are desired.

Much has been said and written of "carpeting," "subcrusts" and "road waves." The author's opinion is that to a great extent the last are caused by the absence of the second and the wrong use of the first-mentioned term. He has not found it desirable or possible to lay down any other

* Paper presented at the annual meeting of the Institution of Municipal and County Engineers.

definite rule for his final face work that applies to all sorts and conditions of roads than "Use your brains." The mixing up of town, harbour, country, main, rural and urban roads and imagining that cost, method and life are but degrees suitable to all is one of the greatest mistakes and causes many pitfalls.

He has found that for an ordinary 18-ft. wide road maintained in the old pre-war days at a cost of about £100 per mile, a thickness of permanent material for "carpeting" or facing of 3½ in. to 4 in. when consolidated is good, sufficient and necessary. Such a road with material costing about 12s. 6d. per ton will last out dry macadam costing 10s. per ton at least six times, giving satisfaction to all reasonable folk and compare favourably at the end of that period with a road that has had its dry surface renewed every other year.

It is useless to say any surveyor can satisfy everybody. The surveyor, being only human, though often thought or treated as if otherwise, will find that permanent material will only at first begin fresh troubles, but common sense must in the end prevail, and good roads will eventually lead to a good time for all.

IMPORTANCE OF ROADS.

Undoubtedly railways are the main arteries, roads the actual nerves that feed and supply these arteries with nourishment, and are consequently of vital necessity to all well-governed communities.

Permanent material can give good roads if sensibly used, and now seems the special time for the roads to be more thoroughly dealt with after their period of semi-starvation, when funds and materials have been compulsorily held over and are again available, instead of causing the already burdened ratepayer to pay more to get back into the old rut. It would seem to be a time when money should be judiciously and sensibly expended for the good of the public and to the ultimate saving of the rates.

One if not the only trouble of permanent road surfaces on its first introduction to a district is its supposed slipperiness. The nervous driver seems to make his horse nervous, and his complaints after hitting the horse will be loud and constant about the "new road." Of course every care should be taken to have sand or grit everywhere to minimise the cause of these complaints, but even then they will arrive. Only this winter, after a sudden frost, complaints were received about a road that had been tar-washed as a temporary step before permanent material was to be used by the author, and on making inquiries he was much struck by the remark of an old Irish roadman, who said, "Nothing satisfies some of these yer folk! Th' Almighty in His wisdom sends us fine weather, wet, frost and snow. These yer complains about dust all summer; you cures it with stopping the dust for 'em, and now they grumbles at the Almighty because He don't send a shower of sand or grit to please 'em when 'tis frosty like!"

It is almost impossible to make permanent roads without their being somewhat more slippery than rough macadam. Doubtless if the horse is to return and continue on our roads, and thus still to be the chief, if not the only consideration, an improved horse-shoe will be devised. Whilst more complaints as to the cost and condition of roads comes from horse-users, few attempts are made by the owners and complainers towards improving the horse-shoes, which as now constructed cannot be finality in man's ingenuity and humanity.

This paper has been an attempt to assist the younger members of the institution in one of their most difficult tasks, and if ever it is in the power of the author to in any way assist a member by giving him any further details of the matters he has here touched upon he will be only too pleased to help in any way.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

TEMPORARY SURVEYOR AND INSPECTOR OF NUISANCES.—August 5th.—Yiewsley Urban District Council. £200 a year.—Mr. W. H. Lea, clerk, Council Offices, Yiewsley, Middlesex.

GAS ENGINEER AND MANAGER.—August 7th.—Ashton-in-Makerfield Urban District Council.—Mr. A. Sykes, clerk, Urban Council Offices, Ashton-in-Makerfield.

SURVEYOR OF HIGHWAYS AND INSPECTOR OF NUISANCES.—August 9th.—Buckingham Rural District Council. £245 per annum.—Mr. Thomas R. Hearn, 26 West-street, Buckingham.

ELECTRICAL ENGINEER.—August 12th.—Ebbw Vale Urban District Council. £250—£300 a year.—Mr. T. Hughes, clerk.

INSPECTOR OF NUISANCES.—August 19th.—Halesowen Rural District Council. £170 per annum.—Mr. E. H. Grove, clerk, Church Steps, Halesowen, Worcester.

ELECTRICAL DRAUGHTSMAN.—For the Admiralty Department of Electrical Engineers.

HYDRAULIC ASSISTANT.—For the Northern Command Establishment. £4 5s. per week.—Chief Engineer, Headquarters, Northern Command, York.

TEMPORARY ENGINEERING ASSISTANT.—Bedford Town Council.—Mr. N. Greenshields, borough engineer and surveyor, Town Hall, Bedford.

TOWN PLANNING ASSISTANT.—Waterfield Rural and Stanley Urban Districts.—Mr. Frank Massie, Tetley House, Wakefield.

STEAM WAGON DRIVERS.—Derbyshire County Council.—The County Surveyor, St. Mary's-gate Derby.

CHELTENHAM.—For the supply of tar-macadam and screening plant, new or second-hand. — Mr. J. S. Pickering, borough engineer, Municipal Offices, Cheltenham.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Engineering: Iron and Steel.

BISHOPTHORPE.—August 8th.—For the sale by the council of a 7-h.p. steam tractor engine, by Robey, Lincoln.—Mr. C. Cecil Lucas, clerk, Urban Council Offices, 6 New-street, York.

BELFAST.—August 16th.—Supply of electricity plant.—Mr. T. W. Bloxam, city electrical engineer, Belfast.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories, &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

Roads.

HOLYWOOD (CO. DOWN).—August 5th.—For the supply of 200 tons of 2-in. and 100 tons of 1½-in. road metal, and 100 tons of screening.—The Surveyor, Town Hall, Holywood.

HADLEIGH.—August 7th.—For the supply of 550 tons of 1¾-in granite.—Mr. H. W. F. Grimwade, clerk, Urban Council Office, Hadleigh, Suffolk.

Sanitary.

BURRY PORT.—August 3rd—6th.—For the construction of an outfall sewer comprising about half a mile of 15-in. cast-iron and stoneware pipe sewers, manholes, &c., 15-in cast-iron sea outfall and other incidental works.—Mr. A. P. I. Cotterell, engineer, 17 Old Queen-street, Westminster.

NANTWICH.—August 12th.—For the construction of about 140 yds. of 9-in. sewer.—Mr. W. Williams, surveyor, Urban Council Offices, 26 Pepper-street, Nantwich.

BLACKWELL.—For the construction of works of surface drainage and storm overflow.—Mr. H. Silcock, surveyor, Rural Council Offices, 67 Westgate, Mansfield.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

AUGUST.

10.—Institution of Municipal Engineers: Southern District meeting at Oxted.
16-17.—Institution of Municipal and County Engineers: Meeting at Abergavenny.
19-20.—Institute of Cleansing Superintendents: Annual conference at Stockport.

SEPTEMBER.

14.—Institution of Municipal and County Engineers: Meeting at Bridgwater.
27-28.—Institution of Municipal and County Engineers: Meeting at Penarth and Barry.

APPOINTMENTS OPEN.

TOWN PLANNING ASSISTANT.

Required immediately in the offices of the Engineer and Surveyor appointed to prepare Town-planning schemes for a large area of the Wakefield Rural and Stanley Urban Districts an Assistant, who should have had previous experience in the preparation of similar schemes.

Applicants should send particulars of experience, age, and salary required, with copies of two recent testimonials, to Mr. Frank Massie, M.INST.C.E., Tetley House, Wakefield. (3,837)

The Surveyor

And Municipal and County Engineer.

Vol. LIV. AUGUST 9, 1918. No. 1,386.

Minutes of Proceedings.

Sewage Disposal.

Two papers which were read at the Annual Summer Conference of the Association of Managers of Sewage Disposal Works recently at West Bromwich were of the usual practical character. In one, Mr. A. D. Greatorex, M.INST.C.E., the borough engineer and surveyor, gave a detailed description of the sewage disposal works of West Bromwich, together with particulars of the results obtained. The present works consist of septic tanks with coarse-grained and fine-grained bacteria beds for the low-level sewage, capable of dealing with a daily dry-weather volume of 1,400,000 gallons. The effluent from the fine-grained beds, after passing over an aërating bed of about 1,000 sq. yds. in area, passes direct to the stream. At the high-level outfall, septic tanks and coarse-grained bacteria beds are provided capable of dealing with a dry-weather flow of about 1,444,000 gallons per twenty-four hours. The effluent from these coarse-grained beds receives further treatment on about 28 acres of under-drained land from which it passes direct to the brook. The storm water at the low-level is dealt with on about 34 acres of under-drained land, and at the high-level on a special storm filter. Some interesting figures are given as to the cost of washing the material in the bacteria beds. Considerable sums have been expended in this way from time to time, the cost varying from 1s. 4d. to 4s. 11d. per cub. yd., and the total of the sums expended since the complete scheme was put into operation in 1903 amounting to £2,200. The interesting question arises whether it is more economical in the end to wash the material when it becomes clogged as in the present case, or to provide means whereby the humus may unload itself in the effluent and thus obviate the need for washing. This can be arranged by treating the bacteria beds in the same way as percolating filters—*i.e.*, providing a complete false bottom of special tiles to support the material above the floor, and constructing humus tanks at the outlets to intercept the humus. This has been done in several places with excellent results. One great advantage of this method is that the bacteria beds maintain their original liquid capacity almost indefinitely, especially when such excellent material is used as at West Bromwich.

The second paper was by Mr. A. V. Reynolds, chairman of council of the association, and dealt with the treatment of sewage by broad irrigation and its possibilities in relation to food production. We fear that the author has dealt with the subject from a one-sided point of view. He apparently assumes that broad irrigation can be successfully carried out everywhere, regardless of the character of the land, and overlooking the fact that it was the failure of the broad irrigation system in a large number of places which brought about the introduction of artificial biological treatment. Again he states that biological treatment "leaves no production" (of food) whatever. This is, however, not the case. The liquid in the form of a purified effluent containing some manurial value is still available for irrigation if required, and the sludge if properly handled can, and should, be used for food production. The difference between the two systems is that in the case of broad irrigation the solids and the liquid are applied to the land simultaneously, while in the case of artificial methods the solids and the liquid are separated. Under certain conditions of weather and cropping there are difficulties in dealing with the daily volume of sewage by broad irrigation, and where the land is unsuitable bad effluents are likely to be produced. Artificial methods, when properly designed, can always ensure satisfactory effluents, and weather conditions do not affect the results. After all, the primary object of a sewage disposal works is to produce a satisfactory effluent, but much more could be done to assist in the production of food if the sludge resulting from artificial methods were utilised to a greater extent, as is being done in some cases. The address of the new president of the association, the first portion of which appeared in our issue of last week, was excellent in every respect, and we take this opportunity to congratulate the association on their selection of Mr. J. E. Willcox as their president for this year. Considerations of space prevent us from dealing with his address to the extent we should devote to it in ordinary times, and we can only recommend our readers to give it their careful consideration. We must, however, support strongly the recommendations made by Mr. Willcox with regard to the provision of a national sewage testing station, and the remarks made by Mr. J. D. Watson with reference to the recommendations of the Royal Commission on Sewage Disposal and the proposed Ministry of Health.

* * * *

Roads after the War.

In the course of the paper which he read at the recent Maidstone meeting of the Institution of Municipal and County Engineers, Mr. H. T. Chapman, the county surveyor of Kent, likened the present condition of the roads to that of a man who, being in a low state of health, is unable to ward off serious illness, and for whom drastic treatment consequently becomes necessary. Mr. Chapman's paper was concerned primarily with his own county, and the figures which he quoted might be described as remarkable but for the unfortunate fact that they are typical of the state of affairs in almost every other county at the present time. The nett result is that, in spite of greatly increased use of the roads, particularly by heavy motor traffic, the quantity of material used on directly maintained county roads during 1916-17 was just about half that used in 1913-14. Further, on the same roads, the total expenditure was reduced in the same period from £169,552 to £141,621, in spite of the enormous decrease in the purchasing power of the sovereign. A consideration of these facts naturally leads to the question, What of the future, with its increase of motor traffic of all kinds? In Kent, in 1917, of the 600 miles of directly maintained main roads, 314 miles carried motor omnibus services, and of the 150 miles of urban roads, 104 miles were similarly used. To bring these roads up to the proper standard for such traffic would at the present time cost over three quarters of a million sterling! What will be the cost for the whole country? As Mr. Chapman says, surveyors are not financiers, and the amount of money involved is so great as to remove the problem from that of municipal to State finance. We trust that this will not result in any failure to realise the urgency of the problem.

* * * *

The Assistant County Surveyorship of Kilkenny.

The reported prosperity of the agricultural and manufacturing communities in Ireland, and the prospect which it opens up in the national sense, is a matter which must be highly satisfactory and encouraging to Irishmen in general. At the same time there does not appear to be any particular reason why economic amelioration should be restricted to this or that class, or that one calling should, more than another, be singled out for illiberal treatment. It would appear, however, that such exclusion from the general process of improvement has been definitely decided upon in the case of county surveyors and their assistants, for we find in the Irish newspapers an advertisement for an assistant county surveyor of Kilkenny, in which the county council are offering a salary of £120 a year. Whether this remuneration does or does not receive high official sanction we know not; all we gather is that the candidate must possess qualifications prescribed by the Local Government Board, and that he will be appointed by the county council subject to the approval of that body. Considering the amounts that are now paid in wages to unskilled workmen, the amount offered in this instance is, by way of contrast, ridiculous. But, apart from such a consideration, the idea of offering a skilled pro-

fessional man £120 a year for work of supreme national importance appears to us to be little short of an insult which the prosperous county councillors of Kilkenny ought to be ashamed to put their names to.

* * * *

Special Fire Brigade Areas.

An Order of some novelty, but at the same time of great interest and importance, was issued this week by the Home Office under the Defence of the Realm Regulations, whereby the counties of Northumberland and Durham and part of the North Riding of Yorkshire are constituted a Special Fire Brigade Area. Although the present scheme is limited in its operation to the area named, we understand that it is intended to make similar schemes for other areas in the near future. The primary object is the protection from fire of buildings of national importance (although provision is made for the inclusion, by arrangement, of other classes of property), and this is to be secured by the organised co-operation of the brigades in the area covered. Shortly, the area is divided into districts and sub-districts. If a fire is beyond the powers of the sub-district brigade a district call can be circulated, while in cases of greater magnitude the whole brigades of the area can be subsidised according to a definite plan. The scheme has the cordial support of the local authorities concerned, and it will no doubt be the means of saving many valuable buildings from destruction. The details have been worked out very thoroughly, and brigades rendering assistance are empowered to charge for their services according to an adequate scale.

THE ROAD MAINTENANCE PROBLEM IN MIDDLESEX.

By H. T. Wakelam, M.Inst.C.E.,
County Engineer.*

Since my last annual report there has been a still further decline from the pre-war standard of road maintenance. Few of the roads referred to in that report are now in a uniformly satisfactory condition, and were normal conditions existing, the defective condition of several of the roads would impel me to withhold my annual certificates for their upkeep.

The weather experienced during the past winter was, on the whole, exceptionally favourable for road maintenance, inasmuch as there was no prolonged period of severe frost, and very little snow. Had conditions adverse to road upkeep been experienced to any extent, I hesitate to think what the consequential damage to roads would have been.

The difficulty in obtaining wood blocks for the repair of wood-paved roads has now become so great that, in some cases, reinstatements are being carried out with compressed asphalt blocks, uncreosoted home-grown timber, and with asphaltic macadam. The reinstatements carried out with these materials cannot be looked upon as permanent repairs, but they are the best materials now available to use as a substitute for creosoted paving until supplies of the latter are again forthcoming.

The erection of factories and other works in all parts of the county still continues, and the high rate of wages offered by Government contractors to all classes of lobour is causing much dissatisfaction among the men employed by local authorities. Owing to this, the task of getting efficient work carried out is becoming increasingly difficult. The cartage of material is also becoming a serious problem, and with a still further reduction in the number of men for civilian needs the standard of road maintenance must necessarily be further interfered with.

The principle involved in the previous paragraph is causing much thought and anxiety, and I cannot help reiterating the remarks made by me some time ago to the effect that the annual roads bill of the county, in regard to main, subsidised and light railway roads, will in time probably rise to a most abnormal amount, as everything points to a continuation of high prices, both of labour and materials, for some time after the war. Taking both the existing and the prospective state of things into consideration, I again suggest the desirability of the county budgeting each financial year for an excess amount (up to at least £25,000) to form a reserve fund for meeting the excessive expenditures which will undoubtedly be required to place the roads of the county again in a condition worthy of a great county like Middlesex when the war is over. Unless a fund of the kind be created a very largely increased annual rate is bound to be the result to provide for the expenditures I have referred to.

Leicester Town-planning Scheme.—Leicester Town Council held a special meeting on Tuesday last and decided to apply to the Local Government Board for authority to prepare a town planning scheme limited, for the present, to the area of land within the borough.

* Extracts from annual report.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

PUBLIC APPOINTMENTS AND MILITARY SERVICE.

To the Editor of The Surveyor.

Sir,—From time to time letters on the above subject have appeared in your columns suggesting that no Grade III. man should have the chance of obtaining a new appointment, and also advocating the "holding up" of chief appointments until the "boys come home." Why? Is it that the "brains of the profession" have answered to the call of King and Country, and that it will not be playing the game to fill appointments during their absence? A very laudable reason, but a poor excuse for adopting the policy of "Penny wise, pound foolish" which obtains in many cases where *temporary* measures are being taken, such as entrusting the surveyor's duties to the hands of the town clerk, or to an unqualified assistant, or if the vacancy is advertised for a temporary man, the applicants have to state "salary required"! The object of not advertising the salary evidently is to get a "cheap" man, possibly an ex-councillor, a sanitary inspector, a builder or a foreman, any one of whom is only too pleased to accept a low wage in order to get a "leg" into the profession. Under these circumstances it stands to reason that the ratepayer's money is wasted when the spending of it is in the hands of inexperienced and incompetent men, to say nothing of the after-effects of two, three or more years of mismanagement of the maintenance of roads and property vested in the council such as waterworks, sewage works, public buildings and so on.

And surely a Grade III. man should have the opportunity of obtaining a better appointment?

Why are so many Grade I. men who hold chief appointments still hiding behind the Ministry of National Service? Is it that they are really indispensable, or that they are too comfortable at home, with very little work to do beyond the minimum amount of general administration? Surely a Grade III. man could be appointed to "carry on" for them until their return? In many cases the chief is a Grade I. man, of military age, often with several Grade III. fully qualified assistants, any of whom could "carry on" for him if he *wanted* to do his bit. How well we remember such a man as this in the early days of the war urging some of his assistants to join up and "wishing that he was ten years younger"! His opportunity has come some time since, but we still find him in his civilian appointment, protected by the Ministry of National Service, and claiming for men he cannot spare!

Yes, Sir, there is plenty of room for a "comb out," and I think in cases like these the councils should see to it that *every* Grade I. man in their service—irrespective of his position—should take his share of defending the country.

And what about the engineers who have "done their bit" and been discharged from the army? In the majority of cases they return to their old appointments, possibly as assistants; but surely they should have some consideration and be given the opportunity of obtaining chief appointments, if only temporary ones. But unless such appointments are advertised how can they move round and reap any benefit for the sacrifice they have made?

One has only to look at the few advertisements that do appear for surveyors and qualified assistants to note that when the salary is stated it is about £3 3s. per week. The offering of this beggarly amount is taking advantage of the present state of things and trying to get something for nothing. Look at a city like Birmingham only last week asking for a specialist in town planning at £3 3s. per week, and it has been proved that the cost of living has increased over 100 per cent on pre-war times. A fully qualified town-planning assistant at £80 per annum! And this is what £3 3s. per week at the present time means. And Rotherham wants an assistant at £150—think of it!

I must apologise for taking up so much of your valuable space, but I think this state of things should be altered, and I hope my letter will be the means of other members of a worthy though sadly used profession who are Grade III. or discharged soldiers airing their views on this subject.

I enclose my card and sign myself—Yours, &c.,

Service Badge.

July 25, 1918.

Association of Managers of Sewage Disposal Works. — A meeting of the Metropolitan district of this body will be held at the St. Albans sewage disposal works to-morrow (Saturday), at 2.30 p.m. Mr. H. H. Humphreys, consulting engineer to the corporation, has kindly consented to read a paper, and the works will be inspected under the guidance of Mr. A. Eade (member), the manager, who will explain the system of treatment. The works comprise all the up-to-date methods of sewage treatment, and include a small activated sludge plant in operation.

Road Work in Kent During and After the War.*

By H. T. CHAPMAN, M.INST.C.E., County Surveyor.

When human beings are in a weak state of health and on low diet they are more susceptible to and less able to withstand disease, strain, worry and unsuitable climatic conditions; and if they do not receive proper attention and their health continues to be neglected, drastic operations and specially skilled treatment become imperative. So it is with roads. Many sections of roads between 1910 and 1914 might be described as in a convaleseent state after having received special skilled treatment and were gradually gaining health and strength, and these generally speaking have bravely withstood the strain of war conditions. On the other hand, a tremendous mileage of roads which prior to 1914 were in a weak state of health and without much stamina—may one say "guts"?—have now beeome chronic invalids and cannot be brought back to health without being operated upon and reeeiving special treatment to prevent them going under entirely.

It was realised before 1914 that new remedies and treatment would be required to build up the health of all our important roads if they were to withstand the strain that they were having to bear, but it was believed that the operations then in hand would go far to effect cures and set them up for some years at any rate.

It was difficult to estimate to what extent the traffic would develop from 1914 onwards, but everyone recognised that quick heavy traffie was developing enormously, and that it would require all our energies to keep pace with it. It was, however, realised long before that time that the former methods of temporising or tinkering were of no avail, and were only false economy. It had also been learnt that the only proper line of action was to discontinue piling material on inadequate and unsuitable foundations, or rather lack of the same and unfavourable subsoils, that the only suitable method was to combine strengthening with improved surfacing, and that in the majority of cases no surfaee improvement exeept of a very temporary nature could be effectual without combining the two operations.

Again, the quick heavy traffic soon demonstrated by its action that even with comparatively strong foundations, which were the exception rather than the rule, the old methods of surfacing with the best materials available without utilising some proper and suitable binding matrix were quite inadequate and unsuitable.

Before the era of the type of traffie referred to the slow-moving traffic usually crawled along the centre of the roads, causing them to become rutted, and these portions consequently received more attention and material than the sides. The quick-moving vehicles gradually drove the slower type to the sides, which were less fit to carry them and consequently received proportionately more damage. This demonstrated that the sides must be strengthened and supported as well as the remainder of the carriageways, and very many miles needed and still need reeonstructing for their full width. The writer proposes endeavouring briefly to visualise:

(1) What probably would have been done during the past four years on the main roads in Kent but for the war.

(2) What should be done to make up the leeway.

(3) Very approximately the financial aspect of 1 and 2.

The approximate mileage and expenditure on the various classes of roads in Kent during the year 1914 was 3,805 and £470,981 respectively.

[Mr. Chapman here set out the comparative quantities of materials used on the directly maintained county roads during the years 1916-17.]

TARRED SLAG MACADAM.

It is perhaps interesting to note the comparative quantities of tar-macadam and granite used during the two years in question, and many readers will no doubt understand the reason and agree that at the ruling prices in 1917 and now the former material gives infinitely better value and that it is more economical having regard to all factors and better suited to the type of traffic on the more important roads. Tarred slag macadam now so extensively used, if properly laid on a suitable foundation, gives good results under considerable traffic of all descriptions.

Three of the Sidcup sections, Nos. 9, 10 and 11, were surfaeed with this material in July, 1911, at an original eost of from 3s. 3d. to 4s. per square yard. Since then these sections have only received surface repairs, including the retopping of portions and annual surfaee dressing, and the total eost up to date, including maintenanee, has varied from 5s. 5d. to 6s. 7d., whieh works out at from 9½d. to 11¼d. per square yard per annum for seven years. It is estimated from records of traffic taken in 1911 and 1913 that something like 8½ millions tons of traffic have passed over the sections, including frequent motor 'bus services.

Tarred Kent ragstone was extensively used on the "second-class" main roads prior to the war, and is quite good for moderate traffic. It has a fair life with careful attention in the way of annual surfaee dressing. The writer has also used it extensively as a base coat and topped it with tarred slag macadam and bitumen carpeting on more important roads. Unfortunately, owing to shortage of labour and military demands, the supplies of this material have recently been exceedingly small.

The writer has frequently stated that the local materials of Kent—viz., ragstone, flint, sea beach and sand—if suitably treated with pitch and tar for base coat work and bitumen for surfacing can be extensively used for reeonstrueting, strengthening and surfaeing the roads, and if suitable plant and appliances are available together with the necessary bitumen, there would be no neeessity to import other materials by sea or rail. This has already been proved by the fact that there are now in Kent over 10 miles of bitumen carpeting, laid on trunk roads, whieh have given most satisfactory results and withstood the most heavy and damaging type of traffic for over three years without any serious deterioration. Probably the mileage would have been nearer 100 but for the war.

The sea beach referred to is from shingle beds on the coast near Hythe, where this material is erushed and used extensively for patching in conjunetion with tar, for gritting when surface tarring, and also for surfacing after being mixed with pitch and tar.

As is well known, many surveyors have obtained excellent results by using selected destructor clinker suitably broken, pulverised and graded and mixed with tar for base coat work and with bitumen for earpeting, but as the writer has not personally adopted this procedure, he does not propose to more than refer to it.

PLANT

It will be recognised that bituminously mixed material cannot be prepared without adequate and suitable plant and appliances in the way of driers, mixers, boilers, &e., of either the fixed or portable type, also efficient and careful supervision are neeessary. Kent county possessed at one time three Koehring (American make) hot mixers, many boilers, sand driers, &c., also ten petrol motor lorries, seventeen steam tractors, and twelve steam rollers, but some of these have taken sea journeys probably never to return. There are, however, in the country many manufacturers and suppliers of the best possible plant, and it is hoped that as soon as their war work energies are over it will be possible to place orders with them and obtain early deliveries.

EXPERIMENTAL CONCRETE SECTIONS.

In the Institution Journal, Vol. XLIV., No. 9, appears a report prepared by the writer in July, 1917, on the experimental concrete sections of road laid on the London-Dover road near Gravesend, between Deeember, 1914 and March, 1915, in whieh the following conclusions appear:—

"Two and a-half years have now elapsed sinee the work was eompleted and the portions surfaced with 3 to 1 eoncrete are practically as good as when finished. The bulk of the 6 to 1 concrete surface is still in fair condition, but the half damaged by the concentrated traffic is of eourse a blot on the whole and might lead the uninitiated to suppose that concrete roads are not in any way a success. This would be misleading and unfair. It is now, however, quite just and reasonable to draw some conclusions from the experiments:—The county surveyor is of opinion that, provided all vehicular traffic can be kept off the surfaee until, say, a month has elapsed after eompletion, 6 to 1 concrete ean be laid (6 in. thick) to carry moderate traffic successfully. For heavy traffic (numerically and individually) on the 6 to 1 concrete (4½ in. thiek) a topping of at least 1½ in. of stronger concrete, say 3 to 1, is necessary. This method is of course more costly. In all cases reinforcement is desirable both to earry heavy loads and prevent surfaee eracks. He does not propose to give any details of cost, or compare concrete in roads with other known materials; other surveyors have made rash statements on the subject without convincing him, besides which the prices of all materials and labour have been in a state of gradual increase since the war.

"Concrete, as is well known, if properly eonstituted, is the best material for most foundations, ineluding roads that ar paved, but it is not in his opinion universally the most suitable base for macadam or bituminous surfacings. A concrete foundation and surfacing combined may be eminently suitable under certain eonditions, such as for new roads on yielding subsoils. It is not, however, an economical proposition to remove an existing adequate foundation and sub-

* From a paper presented at a meeting of the Institution of Municipal and County Engineers at Maidstone.

stitute even 6 in. of concrete in lieu thereof, and nothing less than this thickness would suffice. It is laid under paving to a thickness up to 12 in. He is inclined to think that a base-coat of cheap and comparatively soft local material treated with pitch and tar, and surfaced with what is known as a bituminous 'carpet'—*i.e.*, a mixture of graded sand and bitumen laid hot—of which some ten miles have been laid in Kent, is to be recommended in preference to concrete roads, and that the former will prove more economical and suitable for traffic. Destructor clinker has also been used with success in the base coat and carpet in lieu of stone or flint and sand. In Surrey use is made of the scarified road metal mixed with pitch and tar as a base-coat for carpeting, and this is an economical procedure provided there is a sufficient thickness of road crust to allow of it. Generally speaking, tarred slag macadam as laid very extensively in Kent is also in his opinion to be preferred to concrete as a wearing surface. Bitumen surfacing on concrete foundations have not in all cases proved successful, as the surfacing is liable to creep and push under quick traffic.

"The reason the author has reported on this subject somewhat fully is because it is of great interest to all who are much interested in road construction and maintenance, and also because it is stated that millions of yards of concrete roads have been laid successfully and economically in America. There are also some who strongly advocate the system for use in this country, but he thinks the majority of British road engineers will require more convincing evidence than is available at present before launching out to any great extent."

Nothing has since occurred to cause the writer to amend the aforementioned remarks, except to add that probably after the war the demand for cement for innumerable purposes will be enormous.

WORK AFTER THE WAR.

There are in Kent 504 miles of scheduled "directly maintained" main roads with an area of 5,322,240 sq. yds, 151¼ miles of scheduled main roads in retaining areas with an approximate area of 1,597,200 sq. yds. and 563 miles of scheduled district roads, the area of which is about 4,954,400 sq. yds., making a total area of 11,873,840 sq. yds. of scheduled roads.

At a very moderate estimate 50 per cent of 459 miles of these roads will require extensive repairs as soon as circumstances permit, and this means 5,936,920 sq. yds.

It is not contended that the whole of this area requires entire reconstruction, but if the roads are to be adequately dealt with to meet future necessities they will require some strengthening, probably for the full width, as well as resurfacing with improved material. The main arteries of the county must of course receive first attention, and especially those from London to the Continent; other roads which have recently become of great national importance will probably remain so. There are also many miles of roads that previous to the war were relatively little used, but have owing to timber haulage been seriously damaged, and will have to be reinstated and maintained to carry heavy and damaging traffic in the future.

Again, it is confidently anticipated that our roads, especially in the home counties, manufacturing and agricultural districts, will be used to a much greater extent by heavy self-propelled vehicles for the transit of goods, merchandise, foodstuffs and other commodities, and it is also anticipated that motor omnibus traffic will be greatly developed. All are also looking forward to the time when light cars for business purposes and perhaps for joy riding may again be used. In 1917, of the 600 miles of directly maintained main roads in this county, 314 carried motor 'bus services, and of the 150 miles of urban roads, 104 miles were similarly used. The author then reported to the county council that to bring the 464 miles referred to up to a suitable standard to carry and withstand this traffic would, at a moderate estimate, cost £750,000, and this figure only included the mileage not previously surfaced with improved material, and costs are rising rapidly. In the early days of the war it was thought there might be unemployment and distress among the working classes, and surveyors were requested by Government Departments to prepare relief labour schemes. The author prepared schemes for new roads, widening and otherwise "physically" improving existing roads by diverting, widening, &c., amounting to about £250,000. These have been pigeon-holed and with few exceptions will, he thinks, remain there, as they must now be considered more or less in the nature of luxuries, to wait until the arrears in maintenance and surface improvement (including strengthening of existing areas of roads) have been made up.

The nature of the damage to roads by Government traffic is too well known to need description, but the author does urge that whatever is done in the way of reinstatement and improvement should be tackled in a common-sense manner and that no attempt should be made to temporise or "skimp" the work. What is done let it be done properly and in an efficient manner, and not by trying to do as much as possible for as little as possible, but of course always obtaining full value for the money expended. May it be hoped again to have the counsels and advice of the brilliant organiser and administrator and most eminent highway engineer—Brigadier-General H. P. Maybury, C.B., the author's predecessor in Kent—and the assistance of the gallant officers and men now serving under him; also the assistance, financial and otherwise, of the Road Board and staff? If so, the author is certain that the highway surveyors of this country will in a very few years show the Allies, neutrals and enemy, that Great Britain has made good her ways which lead to prosperity and plenty.

COST.

On reflection the author will not venture to go closely into figures as to what the work foreshadowed will cost, as surveyors are not financiers and no one can predict in what ratio the cost of materials, labour, haulage, &c., will vary after the war; but supposing the cost in Kent based on the area previously referred to be somewhere about one and a-half million pounds, then he thinks that if this is multiplied by, say, 30, equal to 45 million pounds, it will represent something like the cost that would be involved for the whole of England excluding the metropolitan and county boroughs. He will not attempt to suggest how this money is to be raised or apportioned between the Imperial and local exchequers, or contributed by the users of the roads proportionately, but would only point out that, however raised, the user and consumer of the goods carried or the passengers on the vehicles have eventually to provide it, directly or indirectly.

NORTHAMPTONSHIRE ROADS.

By Charles S. Morris,
County Surveyor.*

The ordinary traffic in Northamptonshire—particularly light motor traffic—has further decreased, but on the other hand military and timber traffic have largely increased, and consequently many of the roads are having a heavy strain put upon them.

The reduction in the quantity of metal applied is causing the surface of the roads generally to deteriorate and many sections of the roads require to be re-surfaced as soon as the necessary metal can be obtained.

The difficulty of obtaining labour and team work and the reduced allocation of material by the War Office Road Stone Control Committee renders the task of maintaining the roads in a reasonably good condition increasingly difficult. On the whole, however, the roads have not yet deteriorated to such an extent as to cause any serious cause of complaint; but unless more material is allocated than at present notified for the current year I am afraid that under the heavy traffic they are now carrying the time is not far distant when some of them will be in a much worse condition than they are at the present time.

COST.

The total cost of the whole of the works on the county main roads was £38,322 9s. 6d., the nett expenditure for the year being £35,011 19s. 5d., made up as follows: Urban roads, 36·34 miles, £6,861 19s. 6d. = £188·79 per mile. Roads directly maintained, 281·53 miles, £28,149 19s. 11d. = £100·00 per mile. The total cost over the whole county averages £120·55 per mile, and the nett cost to the council £110·14 per mile. The estimated expenditure for the current year is £43,528 gross and £38,568 nett, or £136·93 and £121·33 per mile respectively.

On the roads directly maintained, the cost of maintenance (exclusive of Road Board work) was £57·26 per mile gross, and £56·51 per mile nett, or, including Road Board work, £101·41 per mile gross and £100·00 per mile nett.

SURFACE TARRING AND TAR GROUTING.

The surface tarring (estimate £4,000) was not fully carried out owing to the difficulty experienced in obtaining supplies of tar and chippings, but the Road Board have intimated that the work may be completed during the current year and the balance of the grant will then be paid to the council.

The tar grouting work was carried out in various lengths upon the most important roads, but the whole of the work estimated for was not completed, and part of it was left over until the current year. The quantity of material grouted with tar during the year on roads directly maintained (exclusive of 'bus routes) was 4,960 tons, at a cost of £1,363 10s., the length coated being 4·20 miles, and on roads maintained by urban councils 1,399 tons, at a cost of £360 8s. 5d. The total length coated with tar binding and tar-macadam on the roads directly maintained up to the end of the year is 112·13 miles (including the London-Holyhead road and the 'bus routes).

"The Surveyor" Book Department.—Readers of "The Surveyor," especially those serving with H.M. Forces, who experience difficulty in obtaining scientific and technical books are invited to send particulars of their requirements to the manager of "The Surveyor," Book Department, 24 Bride-lane, Fleet-street, E.C. 4.

* Extracts from annual report.

Institution of Municipal and County Engineers.

THE ANNUAL MEETING: ROADS CONFERENCE DISCUSSIONS.—(*Conclusion.*)

At the recent annual meeting of the Institution of Municipal and County Engineers, Messrs. Hooley and Webb submitted papers dealing respectively with "Roads During and After the War" and the "Maintenance of Rural Roads." Mr. Hooley's paper was reproduced last week, and that of Mr. Webb will be given in a future issue. A short discussion followed.

Captain F. P. Frank (Stockton-on-Tees), in proposing a vote of thanks to the readers of the two papers, suggested that the institution should forward to the Local Government Board a resolution urging upon them the need of further powers for the acquisition of land for public uses, that the local authorities might efficiently, expeditiously and economically carry out the duties which were placed upon them.

The President said if Captain Frank would put that in writing he would see that it was considered by the council of the institution.

Mr. F. Roberts (Worthing) remarked that something had been said about tarred clinker. Mr. Brodie said he used it twelve years ago. Well, he could go one better and show Mr. Brodie a road which was laid with tarred clinker thirteen years ago. He never thought he would be able to beat Mr. Brodie even by one year. Tarred clinker was worth trying by every road engineer who had a destructor. In Worthing he had 15 miles of roads laid with tarred clinker. He was rather scoffed at when he proposed to use it thirteen years ago, and was told that he would not see any result; but after thirteen years' trial they were still going on, and, as far as Worthing was concerned, it had given every satisfaction. The cost of road construction with this material two years ago was 1s. 2d. per yard. Of course that wanted qualifying. It was only about 2 in. thick. He thought every road engineer should try this material. Even with heavy motor-'bus traffic they had found it quite a success.

Mr. C. F. Gettings (Worcester) said he was sorry they had not had more information upon the subject of concrete roads. Speaking as a county surveyor, he could say that at the present time the cost of many of these materials was prohibitive. With respect to the use of furnace slag, dealt with by Mr. Hooley in his paper, he could say from his experience that, provided it were laid properly, furnace slag made a very satisfactory foundation for roads. He had put down many miles of roads with a slag foundation, and with an average thickness, when consolidated, of between 4 in. and 5 in. Unfortunately, in some cases, they had occasion to break up those roads, and they had found that the slag in many cases had consolidated just like concrete. They took very particular care in grading their material. It must be uniform in size, and, in order to make it satisfactory, the whole of the voids must be filled in with a smaller material, and they went so far as to make a uniform surface of ¼-in. material. Such a material, if properly laid, with the haunches of the road strengthened, would make a very good substitute for concrete. In towns with heavy traffic concrete or reinforced concrete was necessary, but they could not afford, under present circumstances, to lay concrete for county roads. He had been watching very carefully in the last few years the action of tar-macadam. He had taken the trouble in a number of cases of wave action, where he thought the foundation had given way, to cut down to the foundation, which he had found intact; the whole of the wave action had been on the surface. Another point was that tar-macadam roads which had been put down eight or nine years ago had stood splendidly, but other roads put down in a similar manner three or four years ago were not standing so well, simply because a heavy 'bus traffic had been going on during construction.

Major F. R. Phipps (Basingstoke) said that in France they had had to do a great deal of what Mr. Hooley had suggested. Many of the roads in France were too narrow for the traffic required of them, and they had been doubled in width on the lines suggested, of rolled faggoting to the sides of the roads which had to be supported by pit propping. What had struck him was the speed at which the lorries were allowed to travel here. He had noticed them going at the rate of 20 miles an hour. It had been said by Mr. Dryland that the damage to a road was governed by the speed of the traffic; they might say it was the weight into the square of the speed. In France the speed was limited to 8 miles an hour; here it was 16 miles, and the damage here was not doubled but multiplied four times. The military police in France stopped the motor lorries from travelling beyond the fixed speed, and it ought to be done here. The four-wheel driven lorries were used more as tractors to draw heavy siege guns over weak roads. The damage done by their use was considerable. The whole gist of the papers seemed to be that water-bound roads must go. They all realised that here. In France it was impossible; the bulk of the road work was water-bound. But they did try immediately after putting down a road to tar the surface, and he had several lengths of tar-sprayed roads which had a very good surface. Undoubtedly the tar saved the wear of the road to a considerable extent. The macadam roads lasted longer than one would expect from the traffic which went over them. The salvation in France was the paved road. The pavie did stand up to the traffic. It was not laid on concrete, it had simply a sand and grit foundation, and it stood up to lorry traffic of excessive amount, very often continuous double lines of traffic. As the traffic went over the road there was an absolute wave action of the pavie, but it always recovered. Were it not for the paved road the traffic could never have been got to the front lines. The repair was wonderfully easy. The French civilian was an expert at it. When it required repair he did not take up considerable lengths of road; he had a crowbar and took out individual setts, put in some sand, rammed down the new sett with the same crowbar, and after that the traffic was carried in a wonderful way for five or six months. The opinion of engineers in France was that in the future there would be a considerable increase in the volume of mechanically-propelled traffic on the roads. The whole experience of the war showed how necessary it was to make the roads to meet that traffic. There would be an immense number of lorries coming back after the war. The main roads would have to carry a much heavier mechanically-propelled traffic. Another thing which struck one very much in France was the ease of making roads out there. In France they had to make roads at very short notice. Although the land was cultivated up to a couple of miles of the Front, when a road was required they made that road, and the owner was left to make his claim afterwards for any loss or damage to his property. They could not act as drastically as that, but there would have to be some easier way of obtaining land after the war for road-making and widening.

Mr. H. T. Chapman (Kent) said that some twenty-five years ago, when a youthful district surveyor, he remembered purchasing a book written by Mr. Hooley on the maintenance of roads. It was one of the best books he had every read on the subject. Mr. Hooley had ever since continued to give them useful information and assistance in the maintenance of roads, and they were all very greatly indebted to him for his practical and periodical advice and assistance. He was very much interested in what Mr. Hooley said as to strengthening the sides of roads with rolled faggoting. He had constructed roads on the subsoil by that method.

Mr. J. P. Wakeford (Wakefield) said he had hoped to obtain some information on the value of clinker in lieu of broken stone for making concrete. He had no knowledge of this material at present, but, having a very large amount of destructor clinker in Wakefield, he was putting down a 1 to 8 bed of destructor clinker under some Penmaenmawr setts. He thought Mr. Brodie was going on to that when he spoke of destructor clinker. He had used it above ground and its behaviour had been quite satisfactory, but he should like some information about it as concrete.

The President said his opinion as to tar-macadam was that it was a most excellent material to put on roads, and they got most excellent results from it, providing they exercised great care in laying it, and care in supervising it after it was laid. He had tar-macadam roads in his district which had been laid fourteen years, and were practically as good to-day as when laid, and had cost really nothing in maintenance. Of course, there were some roads which had needed repair, but these cost one-third of what they cost in previous years when made of water-bound macadam. With regard to destructor clinker, they must never forget that with clinker, as with all other materials, there was clinker and clinker. He advised them not to run away with the idea that because they had a destructor and a large amount of clinker they had a valuable asset. Perhaps the clinker was of no value.

The vote of thanks was then put and carried.

Mr. Hooley thanked the members for their reception of his paper, and the meeting closed.

Torquay Pavilion Profits.—At the last meeting of Torquay Town Council it was stated that the nett profit on the pavilion for the past nine months was £1,614. Under new management, it was added, a loss of £3,000 a year was being converted into a profit of £2,000 a year.

Lanark Town-planning Scheme.—The District Committee of the Lower Ward of Lanarkshire have resolved to apply to the Local Government Board for authority to prepare a town-planning scheme for an area in the district north of the river Clyde and north and east of Glasgow, which is in course of development or appears likely to be used for building purposes.

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Sewage Disposal.

By EDWARD WILLCOX, M.INST.C.E.*

[*Concluded from last week.*]

No doubt the most remarkable work which has been done during the past year has been in connection with the activated sludge system, and in addition to the installations in operation at Worcester, Stamford and Salford, a large plant has recently been installed at Withington Sewage Works, Manchester, under the personal direction of Mr. E. Ardern.

It is also significant to notice that most of the investigations and research work now being conducted in America relates to this process, and the reports describing these investigations are worthy of careful study.

I need not do more than just refer to the pioneer work of Professor Fowler, Mr. E. Ardern and Mr. Lockett at Manchester, Mr. W. H. Duckworth and Mr. S. E. Melling at Salford, and Mr. Caink at Worcester, as your association has had the privilege of being kept informed by these gentlemen from time to time of the results of their researches and experiments in connection with this process.

A certain difference of opinion exists as to the best appliance for the diffusion of air, but probably the most efficient and reliable method adopted up to the present has been by means of porous plates. At the Withington works an ingenious pulsating arrangement has been adopted, by means of which a considerable reduction is effected in the amount of air required for keeping the aërated sludge in intimate contact with the sewage, and it also helps to prevent deposition of sludge on the diffusers. With this arrangement the diffusers come into action intermittently, as and when required, and the air can readily be regulated both as to volume and pressure.

It is quite possible that satisfactory mechanical methods may eventually be devised by means of which the admixture of air with the sewage will be accomplished, and experiments in this direction are now being carried out by Mr. Haworth at Sheffield, and others.

The plant at Withington is designed to deal by the continuous flow method with 250,000 gallons per day of screened domestic sewage, free from any inhibitory trade effluents, and the results obtained would appear to justify optimistic views as to the possibilities of the process under suitable conditions, and no doubt will receive the serious attention of all those responsible for laying down sewage purification plants in the future.

PRACTICAL PROBLEMS.

There are, however, many practical problems still to be solved in connection with the process, with a view of determining the best principles for adoption in design, both in order to increase the efficiency of the plant and to reduce the cost of construction, as well as for the better utilisation of the sludge resulting from the process.

The importance of maintaining the bottom velocity in the aëration tanks in order to prevent settlement and consequent de-aëration of sludge which would then be liable to become septic, and also the desirability of being able readily to empty the aëration tanks for the purpose of giving attention to the diffusers, or for cleaning, gives rise to the question as to whether the ridge and furrow is the best section for the floor of the tank, or whether with the diffusers placed longitudinally a flat bottomed tank would not be equally satisfactory and less costly.

The further question of the ratio of width to the depth of water requires to be settled, but probably the depth will in many cases be determined by the exigencies of the site and consequent cost of construction.

Another point arises as to the best means of drawing off the effluent from the aëration tank in order to maintain as far as possible an even rate of flow to the sedimentation tank, and how far the aëration tank can be made to act as an equalisation tank in order to effect this purpose, as it is obviously desirable and even necessary to prevent undue velocity in the sedimentation tank, having regard to the flocculent character of the sludge.

Attention has also to be directed as to the manner in which provision can be made for dealing with large and sudden increases of sewage flow, such as would be caused by severe storms, and whether this can best be done by increasing the velocity of flow through the tank, or by providing a standby plant and activated sludge in reserve for same, has yet to be ascertained.

In the absence of any installation designed and constructed in its entirety for this process, it is difficult to obtain a reliable cost basis to compare with other methods of disposal. Where the process has been adopted, existing tanks and machinery have been utilised as far as possible, which together with the war conditions now prevailing render comparisions of cost somewhat unreliable.

In America experimental work on a large scale has been carried out, and Mr. Chalkley Hatton, chief engineer, Sewage Commission, Milwaukee, has published a most interesting *résumé*, based on the investigations at the Milwaukee Sewage Testing Station, in the course of which he points out the necessity of fine screening, without which the sludge settles on air diffusers and affects the treatment. He also discusses the question of ratio of air diffuser to tank surface, but this must to some extent depend on the type of aërating tank used and the character of effluent required.

As the trials of the process on a large scale in the United States have proved successful, schemes are contemplated for Milwaukee, Chicago, Texas and other places.

DRYING OF SLUDGE.

One of the principal points arising in connection with this process is the best means of drying and de-watering of the excess sludge, which contains much more nitrogen than ordinary sewage sludge, and probably in a form more readily assimilated by plant life.

Experience shows that this sludge is difficult to deal with; owing principally to the presence of large quantities of colloidal matters, it does not dry in ordinary sludge beds very readily, and this appears to be an inherent difficulty with colloidal sludge. It has a high moisture content, but settles with extreme rapidity, so possibly tank concentration might be found useful in order to reduce the quantity to be handled. In the States various types of centrifuges and filter presses have been tried, followed by drying in direct heat dryers, but further investigations of this phase of the problem are needed to determine the best means of utilising the relatively high manurial value of the sludge.

No one is yet entitled to claim he has solved the problem of sewage disposal by determining the most efficient and economical means of preventing the pollution of our rivers and estuaries in all circumstances, and it would be most unsafe to assume, as unfortunately has so frequently been done in the past, that because a particular method of sewage purification or disposal has proved successful in one case, a similar arrangement of works will give equally satisfactory results elsewhere.

An impartial judgment based on wide and practical experience is of first importance in designing works which should produce the best possible results under wide variations in local circumstances, all of which require consideration, and the close co-operation of the biologist, the chemist and the engineer is necessary to elucidate the problems arising in determining the best conditions for treatment in each particular case.

THE FUTURE.

On the conclusion of the war much will need to be done in making up leeway in regard to the construction of new schemes together with the extensions and improvements of existing works. The proposal to construct 350,000 workmen's dwellings, as well as other much needed and long delayed building developments, will also entail provision for the disposal of sewage from them. In addition, the establishment of a large number of new and the extension of existing manufactories will no doubt lead to the necessity of affording facilities for receiving much larger quantities of trade waste into the sewers than has hitherto been the case, as it will be of national interest that new industries should not be hampered by want of such facilities, but rather assisted and encouraged.

Having regard to the enormous sum of money which is being spent annually in construction and maintenance of work of sewage disposal, it is in the interest of economy and public health that those entrusted with the management of all such works should not only clearly understand the essential principles involved, but should also have at their disposal the latest results of contemporary experience to guide them in the practical application of the principles.

Although the concentrated attention of many thoughtful observers has naturally resulted in a very rapid development of our knowledge of sewage disposal, the full benefit of their independent researches in various places is only to be obtained by the collection and comparison of the valuable data published from time to time.

It would also be to the national interests for this country to possess a sewage testing station, properly staffed, similar to that in existence at Lawrence, Mass., and able to set up substations as and when desirable, to deal locally with problems arising in regard to particular sewage or trade wastes. New

* Presidential address to the Association of Managers of Sewage Disposal Works.

methods of treatment coming into use would then at the proper time be investigated by a competent and independent authority, and their efficiency co-related with that of various other processes.

The proper purification of the sewage, and the prevention of the pollution of our rivers are matters affecting the health of the community, and the State is interested in requiring that sewage treatment works shall accomplish the best results possible, and therefore to encourage by every means such investigations as I have indicated, especially having regard to the present tendency to use intensive methods of sewage treatment, introducing elements in the operations of plants which place increased responsibility on those in charge of them.

It must consequently be recognised that your labours will become more and more difficult, and of greater importance, for we all agree that no matter how perfect the design of sewage disposal works, or how elaborate and substantial their construction, if badly and carelessly managed, failure will be the result.

At the annual summer meeting of the Association of Managers of Sewage Disposal Works, at which the foregoing address was delivered, Mr. John D. Watson, Past President, in moving a vote of thanks to Mr. Willcox, said he agreed that much good would accrue to the science of sewage purification if there were a recognised authority whose business it was to carry on a system of scientific research, with the view of giving unbiassed opinions to those who were in need of them. He asked representatives of local authorities present to impress upon their constituents the value of the Royal Commission recommendation to set up what they called a Central Authority, and he cautioned them against the assumption that the Government when they brought forward their Public Health Bill, would necessarily adopt the recommendations of the Royal Commission. Mr. Watson thought the proposal to set up such an authority had in it the germs of a system which, if properly organised, would promote efficiency and economy, not only by giving advice, but by deciding upon the standards of purity which should be observed by every local authority in producing sewage effluents in their relation to the volume and purity of the river into which they are discharged. He also thought the incidence of rating necessary to pay for the construction and maintenance of sewage purification works should be influenced by such an authority, whose object should be to purify the river rather than promote the observance of stereotyped rules which tended to penalise some towns and favour others. He illustrated this by saying that if it were necessary for West Bromwich to purify its sewage more thoroughly than, say, Hull—which was in the same watershed, although removed from West Bromwich by a distance of about 180 miles—it did not appear equitable that one town should have to pay so much more for keeping the river clean than another. It was not equitable that a town situated on the lower reaches of a river should be allowed to discharge crude sewage, while another town in the higher reaches of the same river should have to pay a higher rate for sewage purification, any more than it would be fair to charge a resident in a busy street a higher highway rate than the resident in a quiet street. Mr. Watson instanced the case of the Water of Leith Act, where all the owners of the property in the watershed were taxed to meet the expense of constructing works for the purification of that stream.

HOUSING NOW AND AFTER THE WAR.

REPORT OF SIR TUDOR WALTER'S COMMITTEE.

Sir Tudor Walter's Committee on Housing in their report to the President of the Local Government Board make the concrete proposal that a special department should be created for the control of housing requirements. There must still be a large dependance on private building enterprise of one kind or another. This, they state, will in the years immediately after the war be conducted under great difficulties, through high prices and the shortage both of labour and of materials. The committee, therefore, recommend the establishment of a strong Housing Department, with an experienced and capable chief commissioner both at the Local Government Board for England and Wales and at the Local Government Board for Scotland. They also suggest that the country should be divided into districts, and local commissioners appointed who should work under the central control, and yet have executive powers vested in them. The functions of the commissioners should be primarily to secure effective co-ordination between the various local authorities, public utility companies, and other forms of private enterprise, so that the requirements of each district may be fully met. It is suggested that the commissioners might have discretionary powers with respect to building by-laws, so that modifications and relaxations might be made to suit the requirements of individual schemes and avoid the expenditure of unnecessary money.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

How many local authorities realise that there is an Act of Parliament, passed in the year 1907, by which they can frame by-laws for the regulation, and if need be, the suppression of the unsightly advertisement hoardings which disfigure our country-side? Is it not to be regretted that such signs were ever permitted to vie with each other in monstrosity and to deface the charm of our rural amenities? Can not something be done to remove these blots upon our civilisation?

* * * *

Was it not as well that the Liverpool Corporation won the action which was brought against them to recover damages to a bicycle, the tyre of which had been cut by granite chippings spread on a road in the usual manner? If they had lost this case, would it not have been very awkward for surveyors to know how to prevent slippery roads in the future?

* * * *

Is it not true, as stated in the *Canadian Engineer* of June 27th, that "Road construction and maintenance required of the engineer qualifications of just as high order as would be desirable in the case of an engineer required to supervise the construction of railways and canals, for the problems to be solved are exactly analogous"? When will local authorities in this country realise that this is a fact, and by increasing the meagre salaries now offered their surveyors, endeavour to secure the skilful, well-trained supervision that road making and maintenance demand? Would not hundreds of thousands of pounds be saved if our roads were placed under competent management, and is not the present system one of the penny wise and pound foolish kind so dear to the hearts of some of our municipal rulers?

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Was it not an excellent move on the part of the Royal Sanitary Institute to make arrangements for men at the front and bases of the war zones to be trained, and sit, for the examinations for inspectors of nuisances, meat inspectors, &c., held under the auspices of that body? Are there not a large number of men in military service whose civil occupations before joining eminently fit them for such appointments when they return to this country, and is it not to be hoped that considerable numbers of such men will avail themselves of the opportunity thus given them of securing a diploma which will be useful to them in after life? Was it not also quite right of the council of this institute to reduce the fee to these candidates who are so bravely serving their country?

* * * *

Is it at all a matter for surprise that the people in our Royal Parks prefer to walk on the grass instead of on the footpaths? How long will it take the technical advisers of the Office of Works to learn that paths made of loose gravel, which hurts the feet of those walking on it, are completely out of date, and that there are better and more economical methods of construction?

THE CONTROL OF ROADS.

GOVERNMENT SCHEME TO AVOID FRICTION.

In the House of Lords on Wednesday Lord Montagu of Beaulieu asked a series of questions with reference to the control of roads and bridges in the United Kingdom, and among others whether there was any intention of superseding or abolishing the Road Board; and whether any special legislation was proposed to authorise interference with roads and bridges now maintained almost wholly by the ratepayers.

Earl Stanhope said there had been a good deal of misunderstanding on the subject. In the early days of the war aerodromes, munition factories, and so forth sprang up all over the country. Many of them were near main roads, but some were near small roads not fitted for heavy traffic. It was obvious that the damage would be very considerable, and that the cost of repairs was not a fair charge on the local ratepayers. A directorate of the War Office was made responsible, and the Road Board was asked to become its agent in settling these questions with the local authorities. Subsequently the Ministry of Munitions and the Air Force made use of this department to deal with roads with which they were concerned. Apart from actual damage there were obviously many side roads that needed widening to connect them up with the main roads. With regard to damage to the roads the Government took responsibility under certain conditions. He hoped that eventually the control would go back to the local authorities. It was hoped that there was now a scheme which would do away with friction. The general lines of the scheme were that there should be set up a Joint Roads Committee on which the Road Board, local authorities, and Government departments concerned would be represented.

The subject then dropped.

INSTITUTION OF MUNICIPAL ENGINEERS.

DISTRICT MEETINGS.

Business meetings of the Northern, Western and South-Western Districts of the Institution of Municipal Engineers were held at Newcastle, Worcester and Exeter respectively on Saturday, July 27th.

NORTHERN DISTRICT.

Mr. W. Finch, county surveyor of Cumberland, was re-elected district chairman; Mr. W. J. Coulson, surveyor, Cramlington Urban District Council, was elected vice-chairman, and Mr. J. Jameson, surveyor, Castle Ward Rural District Council, was elected hon. district secretary. Mr. G. W. Hall, engineer and surveyor, Felling-on-Tyne Urban District Council, was nominated as a vice-president of the institution.

It was decided to call a meeting for the nomination of members for the council, and that at such meeting the Fuel and Lighting Order be discussed, the matter to be opened by Mr. G. Symon, surveyor, Blaydon Urban District Council.

A vote of thanks to the Lord Mayor of Newcastle for the use of the Council Chamber concluded the proceedings.

SOUTH-WESTERN DISTRICT.

Mr. Frank Latham, borough engineer, Penzance, was re-elected district chairman and Mr. Owen Baines, engineer and surveyor, Paignton Urban District Council, hon. district secretary.

The recent Household Fuel and Lighting Order (1918) was discussed, and the opinion expressed that the council's proportionate contribution to the salary or remuneration of fuel overseer should be compulsory, as some councils were, apparently, endeavouring to get behind this. The rural members felt that there should be an increased allowance for rural officers under the order because of the extra expense necessarily incurred in the journeys caused by the larger areas to be covered.

As regards amalgamation with the Institution of Municipal and County Engineers, the meeting was favourable to the proposal, subject to the maintenance of the Defence Fund and all progressive items of the institution.

Appreciation was expressed at the effect of the institution circular letter regarding salaries and war bonuses. In the case of Honiton Borough every official was given a war bonus.

WESTERN DISTRICT.

No alteration was made in the appointments in this district, in which Mr. Henry Hulse, borough surveyor of Droitwich, is district chairman and Mr. John Brook, surveyor, Stratford-on-Avon Rural District Council, hon. district secretary. No nomination was made in respect to vice-presidency.

AYLESBURY MEETING PROGRAMME.

The programme of the South-Eastern District meeting of the Institution of Municipal Engineers which is to be held at Aylesbury on Saturday, August 24th, is as follows:—

11.30. Meet at Aylesbury Town Hall; welcome by His Worship the Mayor (Mr. R. W. Locke). Short paper, "Aylesbury and its Municipal Works," by Mr. W. H. Taylor, borough engineer and surveyor.

12.0 Visit electricity works. Short descriptive notes furnished by Mr. W. A. Turnbull, electrical engineer. Visit corporation depot *en route*.

1.0. Luncheon at Bull's Head Hotel.

2.0 Leave for sewage disposal works, Bicester-road.

4.0. Visit to public baths, fire station and other places of interest.

5.15. Tea at Bull's Head Hotel.

If time allows a short discussion of the Household Fuel and Lighting Order, 1918, will take place.

Electricity Supplies.—In reply to a question in the House of Commons, the President of the Board of Trade said he was not yet in a position to make any statement as to the intentions of the Government with regard to the Report on Electricity Supplies.

Municipal Undertakings and Industrial Councils.—A conference representing the respective associations of municipal corporations, county councils, urban district councils, and rural district councils is considering the constitution of a joint industrial council, in accordance with the Whitley Reports, in respect of industries in which local authorities are concerned. As regards gas, water, tramway, and electrical undertakings, schemes for the formation of such councils are already being prepared in conjunction with companies, and the present concern of the conference is the organisation which will be required to cover persons employed by local authorities in other undertakings than these. A sub-committee, newly appointed, is to consider the desirability of preparing a scheme in consultation with representatives of employees, and to communicate with the various local authorities as soon as it is in a position to report.

RECENT PUBLICATIONS.*

Map Work. By Major V. S. Bryant, M.A., and Lieutenant T. H. Hughes, P.A.S.I. Price 5s. nett. Oxford: The Clarendon Press.

The aim of the authors of this work has been to provide a text-book for those schools which, in accordance with modern ideas of scientific education, have introduced the subject of map work into their curriculum. Such a subject taught intelligently lends a new interest to the study of geography and history, and at the same time provides valuable mental training in observation and accuracy. Further, it goes without saying that early training in map work has a special value for those youths who intend to take up the profession of civil engineering. The course laid down by the authors is well graduated, and the student is led by easy stages from the elementary idea of the representation of any area by a plan to the arts of map reading, map making and field sketching. A course of practical work and examples suited to each chapter is contained in an appendix, which, if properly used, will keep the young student thoroughly interested. We cordially agree with the authors as to the educational value of the subject, and those schools which are wise enough to include it in their syllabus could hardly find a better text book.

Tables of Safe Loads on Steel Pillars. By E. S. Andrews, B.Sc. (Eng.), and W. C. Cocking. Price 6s. nett. London: James Selwyn & Co., Ltd.

Although this useful little book has been compiled with special reference to the requirements of the London County Council (General Powers) Act, 1909, much of the information given will be found useful for designing under other regulations and formulæ. The formulæ are considered and explained in an introduction, which also comprises some useful notes on design and practical rules for determining end conditions. In view of the fact that the London County Council formulæ will doubtless be used in many places outside their area, the book has a general value. There is a confusing misprint at the end of the first paragraph of the preface where p. xxxiii. should be read for p. 23.

LAW NOTES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

Highway: Obstruction due to Rainfall: Accident: Liability of Highway Authority.—The recent case of *Moul* v. *Croydon Corporation* (King's Bench Divisional Court) is of considerable importance to highway authorities, especially in districts where wood paving is adopted. This was an appeal by the corporation from the decision of a county court judge. The plaintiff claimed damages for personal injuries sustained in consequence of the skidding of a motor omnibus on a road which the corporation had paved with wood blocks, some of which, owing to a heavy rainfall, had swollen and bulged to the extent of 4 in. or 5 in., causing a dangerous obstruction. The county court judge gave judgment for the plaintiff, but the Divisional Court overruled his decision and allowed the appeal on the ground that the omission to reinstate the paving was merely "non-feasance," for which the corporation were not liable.

QUERIES AND REPLIES.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

Building By-laws: "New Building."—"Joist" writes: A house having been demolished by a bomb, will you kindly state if the rebuilding of it would come under the definition of a new building and as such require the deposit of plans?

Assuming that the house has been entirely demolished, its re-erection would, in my opinion, be deemed to be the erection of a new building, and the by-laws relating to the deposit of plans of new buildings will apply.

Sewer Construction.—"Boniface" writes: The owner of a building estate submitted plans for the laying out of several new streets, with sewers under them. The plans were approved by the council and the sewers were duly constructed by the owner, and covered in under the inspection of the council's surveyor; but no houses have yet been built on the estate, and no drains have been connected with the sewers. Will you kindly advise whether the council can legally use them and connect them with their other sewers without the consent of the estate owner?

Yes, in my opinion, he can. I think there can be no doubt that the sewers vested in the council, under sec. 13 of the Public Health Act, 1875, immediately they were approved and covered in, and, in my opinion, it is not material that no drains are yet connected with them. See *Turner* v. *Handsworth Urban District Council* (73 J.P., 95).

* Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week. Other reports will be found on our "Local Government Board Inquiries" page.

BUILDINGS.

Chesterton R.D.C.—On the subject of building by-laws a member reminded the council that at their last meeting an order was made to close as uninhabitable a house which had been built for only four years. He was quite convinced that if they had had by-laws that could not possibly have happened. He thought it showed the very great importance of their having by-laws to start with when building became possible again. The house was built of the wrong material, and in a wrong way altogether. Mr. Bunnett, sanitary inspector, said the council had issued a repairing order, and not a closing order. The water was coming right through one of the walls and taking the plaster off. The council referred the matter to the Buildings Committee.

St. Austell R.D.C.—It was stated that the urgent need of an isolation hospital could not be met owing to the refusal of the Duchy of Cornwall to grant the council a site, all the suitable sites being confined to Duchy property. The council are taking further steps to bring pressure upon the Duchy with respect to the matter.

ROADS AND MATERIALS.

Andover T.C.—The town council have made an offer of £2 per foot for a frontage in Charlton-road, and £2 10s. for land fronting Junction-road, for the purpose of a widening scheme.

Armagh R.D.C.—Strong complaints were made by members regarding the bad state of the local roads, some of which it was stated were in a deplorable condition. The county surveyor, Mr. R. H. Dorman, pointed out that unless additional funds were provided there was no probability of bringing the roads back to their normal condition.

Bridlington T.C.—The town council have completed the purchase of a 9-acre site at the junction of Fortyfoot-road and Cemetery-road, and the borough surveyor, Mr. C. G. Bradley, has been authorised to take over a portion of it for street improvement purposes.

Cumberland C.C.—The deputy county surveyor (Mr. Butler) states in his quarterly report to the Highways Committee that good progress continues to be made with the work of strengthening and resurfacing the main road between Longtown and Gretna. The section between Blackbank and the Plump Bridge, the repair of which was most urgent, was now practically completed, and the necessary work of repairs to the Guards Mill-road commenced.

Devizes T.C.—It is proposed to purchase a tar-spraying machine for £74.

Gloucester R.D.C.—The committee appointed to inspect the stone quarry at Churchdown reported that they had viewed the quarry and stone which had been taken from it, and were of opinion that the stone was suitable for use on the roads in the district. They recommended that the surveyor be instructed to take 100 tons of the stone, and that payment be made to the Churchdown Land Company by way of compensation at the rate of 6d. per cub. yd. measured in the stack. The vice-chairman (Mr. J. H. Jones) having made some comments on the amount suggested to be paid for the stone, the report was adopted on the price being altered to 1s. per ton.

Islington B.C.—The borough council have agreed to a proposition to tar-spray macadam roads used for motor traffic when supplies of tar are available.

Lambeth B.C.—It was reported that the London County Council have agreed to purchase for £1,300 certain properties in Lambeth-road and High-street, Lambeth, for the purpose of widening Lambeth-road.

Leicestershire C.C.—It was reported that the council had been promised a little over 15,000 tons of stone for the upkeep of 1,700 miles of roads. In the circumstances they would have to do the best they could by filling up the holes and keeping the tops in as good condition as possible.

Lurgan R.D.C.—Complaint was made of the cost of repairing the road along Lough Neagh. The chairman (Mr. George Robinson) said he did not think there was any law—and if there was it would not be a just law—that would compel them to repair the road every time it was broken down by the waters of Lough Neagh. The county surveyor (Mr. B. H. Dorman) told the council that it was their duty to keep the roads under their control in proper order. The chairman said as material was so dear the county surveyor should spend as little as possible on the repair of this road at the present time.

Northants C.C.—It was intimated that the Roads and Bridges Committee had made a claim of £1,000 for damage to the road from Wothorpe boundary to Easton-on-the-Hill. With respect to further heavy traffic that would have to be borne by the road the Road Board offered to bear a moiety of the cost of repairs (£3,600). The county council, however, asked that the board should recognise their liability to pay for the damage already done and also contribute £2,400 towards the cost of the contemplated work.

Scarborough R.D.C.—With respect to the proposed new road from Folkton to Cayton, it was reported that the East Riding County Council were prepared to pay £225 towards the cost, and the Sherburn Rural District Council £100, leaving £325 to be contributed by the North Riding portion.

Staffs C.C.—During the discussion on the report of the Main Roads and Bridges Committee, the Rev. W. G. Mayne called attention to the damage done to roads by heavy motor lorries, and said it would be a serious matter for the council unless steps were taken to get those responsible to pay a portion of the damage done. A promise was given that the matter should have most careful consideration.

Swansea T.C.—Alderman Merrells, reporting with regard to the recent annual meeting of the Institution of Municipal and County Engineers, which he attended as a delegate, said he agreed with a most instructive and common-sense paper by Mr. D. M. Jenkins, surveyor, of Neath, to the effect that instead of each authority planning roads only within its own borders, the county should be mapped out in regions, and in each region a committee or council should be set up for the purpose of planning and laying out all future roads. Now that a greater Swansea was within reach he felt sure the Highways Committee would agree with the proposal that a committee should be formed for the obvious purpose of preventing the absurd and extremely costly mistake of the past. From what Mr. Lovegrove, the borough engineer of Hornsey told him, the most economical and durable roads could be made with destructor clinker as a base.

Worthing T.C.—An intimation has been received that the Local Government Board will be prepared to sanction a loan of £3,840 for the reconstructions of footways as soon as the present restrictions on borrowings are removed.

REFUSE COLLECTION AND DISPOSAL.

Rochester T.C.—The city surveyor, Mr. W. Banks, reported that during the twenty months ending June 28th, the total cost of collecting, &c., of waste paper was £249 7s. 11d., and the total received for that period was £383 0s. 5d., leaving a balance of £143 12s. 6d. The weight of the paper collected was over 77 tons, an average of 3 tons 17 cwt. per month.

SEWERAGE AND SEWAGE DISPOSAL.

Bethnal Green B.C.—The President of the Local Government Board has written stating that the board had been in communication with the Treasury with regard to the representations made by local authorities for reimbursement by the Government of the whole or part of the cost to make good the damage to public sewers and other underground works through enemy air raids, and that the Treasury regretted its inability to sanction a charge against public funds for the purposes referred to.

Conway R.D.C.—The surveyor has prepared a sewerage and water scheme for the parish of Dolgarrog. The sewerage scheme is estimated to cost £4,500, and the water scheme £1,289.

WATER, GAS, AND ELECTRICITY.

Andover T.C.—The borough surveyor, Mr. R. W. Knapp, has outlined a scheme for the improvement of the waterworks, and has been instructed to prepare further details for the consideration of the council.

Birmingham T.C.—The city council on Tuesday last resolved to proceed with the amended scheme for the permanent generating station at Nechells, for the mains and sub-station equipment, and for the provision of a linking-up main between the Nechells station and the Smethwick boundary, at an estimated cost of £1,626,140.

Exeter T.C.—The city electrical engineer, Mr. H. D. Monco, reports a nett balance on the electricity undertaking for the past year of £1,348, against £2,043 in 1916-17.

Merthyr T.C.—Mr. T. F. Harvey, waterworks engineer, states that the Taf Fechan reservoir will be by far the largest in South Wales. It will form a lake 2½ miles long, and will hold 3,300,000,000 gallons, and the proposed trunk main will

be laid to a point nearly a mile below Llancaiach station—not 16 miles from Newport. The gathering area is over 8,300 acres, with a remarkably high rainfall, and even the large storage of 3,300,000,000 gallons does not exhaust the possibilities of the watershed.

Northallerton R.D.C.—The surveyor, Mr. T. G. Easdale, submitted an estimate of £600 for water mains at West Rounton in connection with the water supply. The council decided that the work should be postponed till after the war.

Northumberland C.C.—The council have referred to the Public Health Committee the question of water supplies for East Northumberland.

Wellingborough U.D.C.—The Local Government Board wrote stating that they were unable to regard the application for a loan of £7,300 respecting the purchase of land in the vicinity of the waterworks as a case of such pressing necessity for reasons of public health as would justify them in approaching the Treasury with a view to the sanctioning of a loan at the present time, and suggesting that the council should endeavour to lease the land with the option of purchase when the present restrictions on borrowing were removed. The council considered in committee a proposal to form a syndicate for the purpose of taking over the land with a view to securing it for the council.

STRAKER-SQUIRE MOTOR VEHICLES.

The accompanying photographic view depicts a fleet of Straker-Squire and other vehicles, showing a portion of Messrs. Maple & Company's (Tottenham Court-road) fleet, lined up with their staff. The whole of these machines are on Motor Volunteer work, and are being used exclusively on work of the greatest national importance. These vehicles are accomplishing the most arduous work, including very long distance runs, and it can be said without fear of contradiction that there is hardly a more severely worked fleet of machines in the Metropolis. When motor vehicles were first introduced to the public some eighteen years ago as a freight-carrying possibility, they were purchased experimentally in ones and twos, and as their great value for fast traffic purposes became apparent, Messrs. Maple used their slowly accumulated experience of a variety of makes to single out the best types as they revealed themselves particularly suitable for all-round work. Situated as Messrs. Maple are, in the very heart and centre of London, and all their departmental chiefs being enthusiastic motorists themselves, the firm were in a particularly favourable position to examine the claims and reputation of every type of vehicle on the market, and to test it as to its suitability for arduous work. Their example is typical of the manner in which large using concerns have built up substantial fleets by a process of slow elimination.

A London Firm's Fleet of Straker-Squire Motors.

Middlesex Sewage Effluents.—Reporting with reference to the maintenance works carried out on the 122 miles of rivers and streams in Middlesex, Mr. H. T. Wakelam, M.Inst.C.E., the county engineer, states that fifty-five samples of effluents were taken from the different works of sewage disposal, the property of local authorities, during the year ended March 31st last, on which the county analyst had reported that 76·37 per cent were "good," 16·36 per cent were "moderate," and 7·27 per cent were "bad." The percentage of bad samples was lower than the average for several past years. Forty-one samples of trade effluents were taken, of which 9·76 per cent were certified by the county analyst as "good," 7·31 per cent as "moderate," and 82·93 per cent as "bad."

PERSONAL.

Mr. J. N. Jefferies, surveyor to the Chepstow Urban District Council, has been appointed local fuel overseer.

Mr. T. H. Richards, surveyor to the Caerphilly Urban District Council, has been appointed local fuel overseer.

Mr. C. Day, borough surveyor, and Mr. R. L. Honey, deputy borough surveyor, have been appointed joint local fuel overseers for the borough of Chatham.

Mr. Thomas J. McCarthy, Tralee, Mr. William J. Foley, and Mr. Edward Wren, Castleisland, have been appointed assistant county surveyors of Kerry.

Mr. W. J. Hiscocks, surveyor to the Whitchurch Rural District Council, has been appointed local fuel and lighting inspector at a salary of £25 a year.

Mr H. G. Nicholson Lailey, surveyor to the Trowbridge Urban District Council, has, with the consent of the Local Government Board, been appointed temporary sanitary inspector. The board suggested that an assistant inspector should also be employed.

Mr. H. Moody, the North Holland surveyor, has been appointed by the Roads and Bridges Committee of the Holland County Council to take charge of the roads in the whole county, in succession to Mr. A. W. Lloyd, until recently county surveyor for South Holland.

Mr. A. F. Moon, J.P., an ex-chairman, has presented to the Kingswood Urban District Council the photo of Sapper W. C. Glynn-Warne, R.E., the eldest son of the council's engineer and surveyor. Sapper Glynn-Warne, who enlisted in the South Midland Royal Engineers in May, 1915, was killed in action on Good Friday, March 29th, ten days before his twenty-first birthday. He intended following the profession of surveyor and engineer. He was a student of the Surveyors' Institution, and at the time of his enlistment was studying for other professional examinations. His photo has been hung in the council chamber. The surveyor's assistant, Second Lieutenant F. H. Hayes, who enlisted in the S.M.R.E. on the outbreak of war, is a prisoner in Germany.

MOTORS AND MUNICIPAL WORK.

Neath Rural District Council have decided to purchase a steam wagon.

Worcester City Council have authorised the Electricity Committee to purchase another motor wagon, either electric or steam.

Cornwall County Council Finance Committee have sanctioned the purchase of a motor car for the county surveyor, Mr L. D. Thompson, up to £350.

A committee of the Stirlingshire Eastern District Committee has been authorised to deal with the purchase of a new or second-hand steam tractor.

Southgate Urban District Council have accepted the tender of Messrs. Aveling & Porter, at £1,163, for the supply of a steam wagon for use in the surveyor's department.

Pontypool Urban District Council are making inquiries of the Government Department concerned if they will be allowed the use of petrol in the event of their purchasing a motor lorry for the collection of house refuse.

With regard to the list of Government surplus property for disposal after the war, the Chippenham Rural District Council have replied to the War Department that they would be prepared to negotiate for the purchase of one or two lorries or tractors.

— THE —

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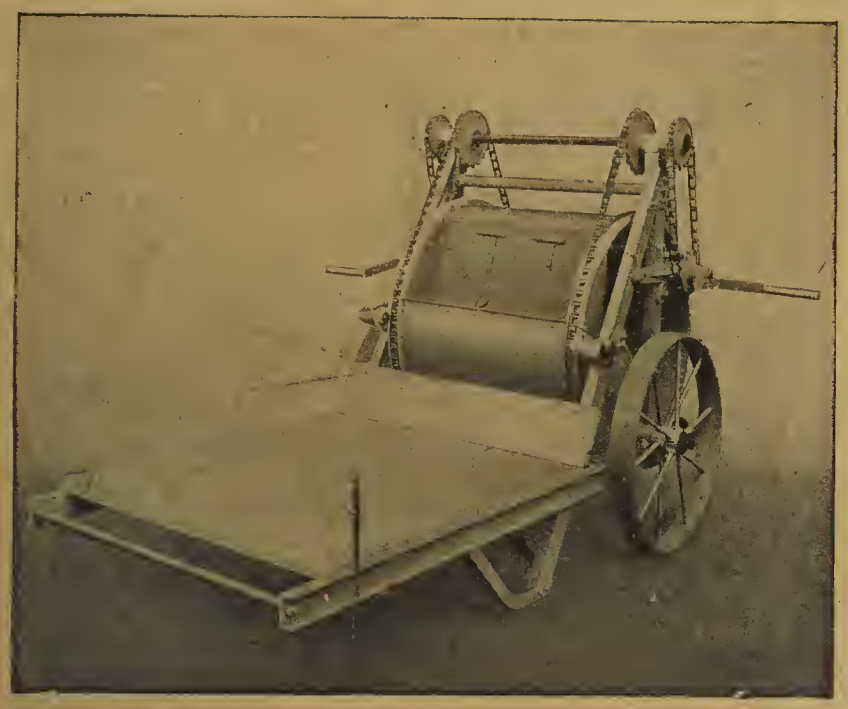

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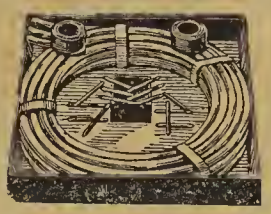

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APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

GAS ENGINEER AND MANAGER.—August 14th.—Burton-on-Trent Town Council. £500 a year.—Mr. John B. Chapman, town clerk, Town Hall, Burton-on-Trent.

INSPECTOR OF NUISANCES.—August 19th.—Halesowen Rural District Council. £170 a year.—Mr. E. H. Grove, clerk, Church Steps House, Halesowen.

INSPECTOR OF NUISANCES.—August 23rd.—Easingwold Rural District Council.—Mr. F. J. H. Robinson, clerk, Council Offices, Easingwold, Yorks.

ARCHITECT AND SURVEYOR.—August 30th.—Gellygaer Urban District Council.—Mr. Frank T. James, clerk, Council Offices, Hengoed, Glam.

ASSISTANT COUNTY SURVEYOR.—September 9th.—Kilkenny County Council. £120 a year.—Mr. Thomas Drew, secretary, Court House, Kilkenny.

COUNTY SURVEYOR'S ASSISTANT.—Somerset County Council.—Mr. Gordon R. Folland, acting county surveyor, Wells, Somerset.

INSPECTOR OF NUISANCES.—Godstone Rural District Council.—Mr. Christopher Phillips, clerk, Council Offices, Oxted.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

WIGAN.—August 19th.—For the extension of the electricity works.—Mr. R. B. Donald, borough engineer and surveyor, Municipal Offices, King-street West, Wigan.

GLOUCESTER.—September 9th.—For the erection of a pavilion of twelve additional beds at the tuberculosis block of the Oban hospital.—City Surveyor, Guildhall, Gloucester.

Engineering: Iron and Steel.

BELFAST.—August 16th.—Supply of electricity plant.—Mr. T. W. Bloxam, city electrical engineer, Belfast.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories, &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

Sanitary.

NANTWICH.—August 12th.—For the construction of about 140 yds. of 9-in. sewer.—Mr. W. Williams, surveyor, Urban Council Offices, 26 Pepper-street, Nantwich.

BLACKWELL.—For the construction of works of surface drainage and storm overflow.—Mr. H. Silcock, surveyor, Rural Council Offices, 67 Westgate, Mansfield.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

AUGUST.

10.—Institution of Municipal Engineers: Southern District meeting at Oxted.
10.—Association of Managers of Sewage Disposal Works: Meeting at St. Albans. 2.30 p.m.
16-17.—Institution of Municipal and County Engineers: Meeting at Abergavenny.
19-20.—Institute of Cleansing Superintendents: Annual conference at Stockport.
24.—Institution of Municipal Engineers: South-Eastern District meeting at Aylesbury.

SEPTEMBER.

14.—Institution of Municipal and County Engineers: Meeting at Bridgwater.
20-21.—Institution of Municipal and County Engineers: Meeting at Middlesbrough.
27-28.—Institution of Municipal and County Engineers: Meeting at Penarth and Barry.

APPOINTMENTS OPEN.

SOMERSET COUNTY COUNCIL.

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The Surveyor

And Municipal and County Engineer.

Vol. LIV. AUGUST 16, 1918. No. 1,387.

Minutes of Proceedings.

The Repair of Footbridges.

Questions frequently arise as to the liability for the repair of footbridges used in connection with public footpaths. As a general rule, and *primâ facie*, as our readers are aware, bridges are reparable by the county council. But, to cite the *dictum* of Lord Campbell in *R.* v. *Southampton* (1852; 18 Q.B. 841), "Every structure which enables a passenger to cross a running stream is not a county bridge." And in that case it was held that an old footbridge, formed by three oak planks, 9 ft. or 10 ft. long, with a handrail, over a small stream was not such a bridge as the county were bound to repair. There is, however, so far as we are aware, no legal definition of a "bridge," and it is apparently a "question of fact" whether a given "structure" (to adopt Lord Campbell's expression) is a "bridge" reparable by the county, or a portion of the highway, reparable as such. There can be no doubt, we should think, that the great majority of footbridges fall within the latter category, and it seems clear that the liability to repair a footpath includes the liability to repair the footbridges which form parts of it. Footpaths which became public before the passing of the Highway Act, 1835, are reparable by the highway authority, unless it can be shown that the landowner or some other person or body is liable to repair them, either *ratione tenuræ* or otherwise—as, *e.g.*, under an Inclosure Act. As to footpaths which did not become public until after the passing of the Act of 1835, there may be some doubt; but it would appear that they too will generally fall within the same category, even although the formalities required by sec. 23 of the Act may not have been complied with—and that section does not, in express terms at all events, apply to footpaths, but only to roads and occupation ways. And it has been held that, in a disputed case, it is for the highway authority to prove that the highway in question is one to which the section applies (*Attorney-General* v. *Watford Rural District Council*, 76 J.P. 74). Since the passing of the Local Government Act, 1894, parish councils have had the option of undertaking the repair and maintenance of public footpaths not being footpaths at the side of a public road; but it is expressly provided by the Act that this power and its exercise is not to relieve any other authority or person from any liability with respect to such repair and maintenance. The liability to span a bridge apparently includes also the liability to reconstruct it if and when this becomes necessary. It is clear at any rate that this is so in the case of a county bridge. This was decided in *Rex* v. *Bucks* (12 East 192). The bridge in question had been built by Queen Anne and constantly repaired by the Crown until about 1797, when it became ruinous, and the King removed it and appropriated the materials, and thirteen years afterwards it was held that the county must build a new bridge.

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A Technical Point.

In the July issue of Knight's *Local Government Reports* a case is reported (*R. v. Chapman ex parte Arlidge*) which affords a fresh illustration of the difficulty that may be caused to a sanitary authority by an owner of property who is prepared to go to the trouble and expense of contesting purely technical matters of procedure in the higher courts. In the case in question an owner had been served with a notice to abate a nuisance under sec. 4 of the Public Health (London) Act, 1891, in the following circumstances. By one of the standing orders of the Westminster City Council, the chairman of any committee may, when the council is in vacation, give instructions with regard to any matter of an urgent nature, provided that such acts shall be reported to the council. In 1917 the Public Health Committee passed a resolution appointing its chairman to deal with urgent matters during the summer vacation, and in pursuance of the power so delegated the chairman directed the service of the nuisance notice in question, which recited that *the council* was satisfied of the existence of the nuisance. The action so taken was subsequently reported to and approved by both the committee and the council. The nuisance not being abated, a summons was issued and an order for abatement was duly made by a magistrate. The owner now sought to have this order quashed on the ground that the magistrate had no jurisdiction to make it, inasmuch as the original notice had not been given by authority of the council or the Public Health Committee. Fortunately the court was able to hold (Mr. Justice Atkin, however, dissenting) that the subsequent ratification related back to the doing of the act ratified, and that the proceedings were therefore good—a fortunate result in view of the opinion expressed by one member of the Court that "on the merits of the case, there are absolutely none with the owner."

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Jerusalem's New Water Supply.

From rain cisterns and defective underground house reservoirs to a wholesome and plentiful supply of town water is a far cry in normal circumstances, but in Jerusalem, where the transformation has been effected under British administration, it proved to be merely a matter of willing and doing it in a few months. All that the racial indolence and apathy of the Turks failed to do in some 400 years has been accomplished by the Royal Engineers, who, having found a group of springheads in a clean gathering ground on the hills yielding some 14,000 gallons an hour, have contrived to raise it and, by means of a pipe line, convey it to Jerusalem. Supplies, we are told by Mr. W. T. Massey, now run direct to the hospitals, and at standpipes in every quarter of the city the inhabitants take as much as they desire, with the result that the water consumption has become ten times what it used to be. In addition to the supply available from standpipes arrangements have been made for filling the cisterns on the one condition, based on the grant of a certificate after inspection, that they are thoroughly cleaned out and put in order. The installation, Mr. Massey states, was a triumph for the Royal Engineers. A preliminary investigation and survey of the ground was made on February 14th, and a scheme was submitted four days later, but, owing to the shortage of transport and abnormally bad weather, work could not be commenced till about the second week in April. Many miles of pipe line had to be laid and a powerful pumping plant erected, but water was being delivered to the people of Jerusalem on June 18th. Although it was only what was to be expected of them, the Royal Engineers are to be congratulated upon the success of a scheme whose beneficial effects upon the health of the city have been instant and widespread.

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Reform of Highway Administration.

In the many discussions that have taken place concerning the restoration of our highway system after the war, there has been a tendency to avoid a frank consideration of the administrative, as distinguished from the technical, questions involved, and in attempting to supply this omission by his paper at last Saturday's meeting of the Institution of Municipal Engineers, Mr. Crowter performed a very useful service. We have more than once pointed out in these columns that, as might have been expected, since the passing of the great Highway Act of 1835, there has been a steady tendency to enlarge the unit area of administration. The time has now come, however, when the question whether the county is a large enough unit area for main roads must be faced. Mr. Crowter is of opinion that, having regard to the development of long-distance through traffic, the main trunk thoroughfares should definitely be considered as State roads, and placed under the direct control of the Road Board, the State bearing the whole

of the financial burden, and the board being entirely responsible for questions of policy. If any such scheme were inaugurated, the county councils might still carry out the work of reconstruction and maintenance, but they would act as contracting authorities and would bear no financial burden. Mr. Crowter further suggests that roads other than the main trunk routes should be classified as county roads and district roads respectively, any dispute as to classification being settled by appeal to the Road Board. It can hardly be expected that the scheme outlined by Mr. Crowter will meet with unqualified approval in all quarters, but at least it affords a fair basis for the discussion of an important and difficult problem.

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Corrugation. In our opinion Mr. Dryland has performed a real service in calling attention to the prevention of corrugation as being one of the principal problems which call for early solution by highway engineers. The experience of tramway and railway engineers shows that the evil is common to all tracks bearing wheeled traffic, and, broadly speaking, its extent varies in duplicate ratio of the weight and speed of the vehicles which cause it. Mr. Dryland's experience and observation have led him to the conclusion, which seems to be perfectly reasonable, that for a constant class of traffic wave formation has a direct relation to the plasticity of the track surface. If this be so, and if we assume, as we must, that the traffic of the future will largely consist of heavy motor vehicles running on tarred surfaces, corrugation, with its consequent discomfort to the users of lighter vehicles, would appear to be inevitable. Unless a genius arises to provide a way out, it would seem that the resulting situation will lead to conflict between traders and highway authorities upon the question of limitation of the weights and speeds of vehicles. The wiser course would be to secure the immediate appointment of a committee representative of all the interests involved to hold a full investigation, and to make the best recommendations possible for meeting in advance a difficulty that must arise in the near future. With mutual good-will and co-operation much may be accomplished.

THE CONTROL OF HIGHWAYS.

IMPORTANT RESOLUTIONS OF THE INSTITUTION OF MUNICIPAL ENGINEERS.

At the last council meeting of the Institution of Municipal Engineers the following resolutions, which stood on the agenda in the name of Mr. Reginald Brown, M.Inst.C.E., were carried unanimously:—

(1) "That it be an instruction to the secretary to send forth the following protest to the Road Board or other proper authority: This institution views with alarm the growth of a military control of the highways of the country, as such a control is not in their opinion to the best interests of the ratepayers or municipal engineers who have had the control of the highways hitherto, and the institution strongly protests against such a control being set up."

(2) "That it be an instruction to the secretary to communicate with the Transport Board and ask for this institution—as representing municipal engineers—to be represented on the transport boards now being formed all over the country, so that its members may be kept in touch with all questions of transport affecting roads and traffic thereon."

Theory of Action of Sand Filters.—Kisskalt's view that the action of the sand filter in water purification is biological and due to the destruction of bacteria by other organisms is contested on the basis of experience at Zürich waterworks, where the lake water is filtered in two stages through sand. The first retains most of the fresh-water planktons, but allows some of the bacteria to pass. The bacteria are retained by the second filter, and at the surface, so that at a depth of 10 cm. the number per c.c. has already fallen to one-tenth. Furthermore, the retention of bacteria is satisfactory even when there are considerable fluctuations in the number of bacteria in the water, and it is concluded that the process is mechanical rather than biological. (L. Minder, *Journal für Gasbeleuchtung*, No. 61, 1918.)

Granolithic Paving.—Maidstone, in the paving of footways, will bear comparison with any provincial town. Up to 1888, over 20,000 superficial yards of Stuart's granolithic paving had been laid, at a cost of £4,280; and since that time the area has been very considerably extended. The loan for the original paving has long since been repaid, while the condition of the work done is still excellent, and in no case so far has it been found necessary to renew any street, even under the conditions of the heaviest traffic. "Maidstone," remarked Mr. T. F. Bunting, the borough engineer, in the course of his paper at the recent meeting of the Institution of Municipal and County Engineers, is "a standing advertisement for this form of pavement, and the expenditure on this work has undoubtedly been a wise one."

SEWAGE DISPOSAL AT MAIDSTONE.*

By T. F. Bunting,
Borough Engineer and Surveyor.

In 1888 the sewage of Maidstone was conveyed by gravitation to works 1 mile above the locks at Allington, and, after screening and precipitation by lime, the effluent was diluted with 50 per cent of river water and then discharged into the tidal portion of the Medway a few yards below the locks. Needless to say, this method was unsatisfactory, and that, beyond keeping the sludge out of the river, very little purification of the effluent was obtained; and during flood tide the proportion of effluent to river water in the neighbourhood of the locks gave rise to numerous complaints of nuisance. About the year 1898 the tank capacity for precipitation was only equal to about two hours' flow of sewage. The experiments were made on a considerable scale, with double contact beds, the results proving most satisfactory. These experiments continued over several years, and were conducted with the assistance of Mr. W. J. Dibdin. About the year 1903 the late Mr. G. R. Strachan was instructed to prepare a scheme for the disposal of the town's sewage, which was eventually carried out. Mr. Strachan unfortunately died before the completion of the various contracts. The works were completed under the direction of his successors (Messrs. Strachan & Weekes) and opened in 1909. The site of the old works was transformed into a pumping station worked electrically on the energy supplied from the corporation's own generating station.

The sewage is screened on reaching the pumping station by means of three lifting screens, and one fixed screen, the three former being lifted for cleansing by an overhead electric travelling crane. Four Gwynne's centrifugal pumps for lifting the sewage to the new disposal works at Aylesford, 3½ miles further down the river, are provided, each equal to dealing with twenty-four hours' dry-weather flow of 1,000,000 gallons; so that during wet weather three volumes can be delivered to the works, leaving one pump as spare.

Three similar storm-water pumps, each capable of dealing with 1,500,000 gallons per twenty-four hours, or a further three volumes, are provided, so that during heavy storms six times dry-weather flow is dealt with, leaving one pump as spare on each section. This storm water is dealt with on a site of 3 acres adjoining the pumping station, and the effluent from these filters is discharged into the original effluent sewer. The lift of the sewage pumps is 31½ ft. and that of the storm-water pumps 21 ft. The sewage is conveyed to the disposal works partly by a 24-in. cast-iron main, and for part of its length by an egg-shaped culvert 3 ft. 9 in. by 2 ft. 6 in., and the latter is laid through the ragstone at a depth varying to 50 ft. and for a distance of 1,000 yds. This portion was laid in a tunnel and the stone removed by blasting. The pumping main crosses the Medway before reaching the works by means of two 18-in. diameter steel tubes, controlled at either end by values, so that either of these, or both, can be used at will.

At the works the sewage is delivered into four sedimentation tanks, each having a capacity of 375,000 gallons, or a total of 1,500,000 gallons. The tank effluent is afterwards passed through the percolation filters, ten in number, and 85 ft. in diameter, and of a depth of 9 ft., and the effluent passes into the Medway; and this, which is tested daily, has never yet been found liable to secondary putrification. The works were opened in 1909.

The present system of dealing with the sewage has been adopted after a series of experiments with a view to minimising any aërial nuisance from the treatment, and consists in passing the sewage through one tank only, and adding to the tank effluent, during the summer months only, from 2 to 6 grains of lime per gallon. It then undergoes a second precipitation, and the effluent, which is kept just alkaline by means of the lime, is passed on to the filters. It has been found necessary during very hot periods to add, in addition to the lime, a small quantity of bleaching powder to prevent any aërial nuisance from sulphuretted hydrogen being released into the atmosphere through the splashing of the sewage on the surface of the filters from the sprinkler arms. The distribution is by means of revolving sprinklers of the Candy-Whitaker type. The sludge is disposed of by ploughing it into the land after being air-dried in lagoons, and various crops are grown, consisting of potatoes, roots, clover, and rye-grass, &c. The area of the land attached to the works is 28 acres.

The total expenditure on the scheme has been just under £70,000. The loan for purchase of land was for sixty years, for building sand tanks, filters and pumping mains for thirty years, and for machinery twenty-one years.

The working cost of the pumping station for the year ending March 31st, 1917, was £1,900, including wages £726, current supply £593 and rates and taxes £437; that of the disposal works being £1,591, including wages £299, and rates and taxes £919 9s. 5d. The produce of the farm at the disposal works amounted to £362.

* From a paper read at a meeting of the Institution of Municipal and County Engineers held at Maidstone.

Roads in War Time and the Aftermath.*

By GEO. CROWTER, Engineer and Surveyor, Godstone Rural District Council.

I think it can be safely assumed that as a whole the clock of progress, so far as road efficiency is concerned, has been put back ten years, and that the roads of this country are in a state which may be described as quiescent.

The particular question which to my mind requires very careful thought is, How far can pre-war local government in relation to the maintenance of highways be adapted to after-war conditions? I am bold enough to assert that when the period of reconstruction commences it will be found that existing local government will be too parochial in its nature and application, and will be incapable of that progressive pace which will be set by the revival of commercial industry. What then is the remedy?

The quality of the broth is regulated not so much by its ingredients as by the number of persons engaged upon its production. Therein then lies the secret of success or failure—comprehensive control.

Will anyone deny that in the near future the highways and by-ways of this country will be used to an extent never anticipated or dreamed of, that internal commerce will so develop that road transport will become probably the greatest factor in local government administration? How then do we propose to meet the colossal expense which such a contingency will impose upon us? Surely not in the manner at present prevailing. We hear of numerous authorities who have been accumulating unexpended balances in anticipation of future needs, but the aggregate of such accumulated funds will form but an infinitesimal proportion of what will be necessary, and, while commendable in a way, the method is unfair—it is too parochial.

Then what is the remedy? Again I say,

COMPREHENSIVE CONTROL.

Now it must be distinctly understood, and let there be no doubt on the subject, the form of control in regard to highways must and will be by civil administration. We cracked out roadstone by civil process before the war, and we are quite capable of doing so again; therefore, the military element which has wormed its way into Mr. Bumble's confidence for the time being must at the close of the war be carefully packed away with Dora's skirts. Preserve the relics for posterity to gaze upon by all means, but beyond this have done with it.

I can conceive that the process of reconstruction will ultimately develop three distinct classes of traffic in this country, which for easy reference may be designated as follows:—

(*a*) State commercial and passenger traffic.
(*b*) County agricultural, industrial and passenger traffic.
(*c*) Local general traffic.

Opinions, of course, are bound to differ on this point, and I merely give my own for the purpose of argument.

Assuming the existence of such traffic, then it will be necessary to classify the roads that bear it, and this might be done in the manner following:—

(*a*) State roads.
(*b*) County roads.
(*c*) District roads.

The process of classification can only be regulated by the ultimate development of traffic, but a preliminary basis could easily be arrived at on pre-war records and conditions.

STATE ROADS.

The State roads of the country should constitute the main trunk thoroughfares, connecting the great commercial and industrial centres; they should in the first instance be classified as such by the Road Board, and placed under the board's direct control, and all powers of local government should be transferred to the board, who would constitute the "Local Authority."

It might be desirable—even imperative—that the county councils should act as the contracting authorities for the purpose of reconstruction and maintenance, but the policy to be pursued should be entirely at the discretion of the Road Board.

Now the cost of such an enterprise should certainly be undertaken by the State; there should be no question of a county levy for such a contingency. Why should one section of the community be specially victimised (on account of its geographical situation, and the proximity of, say, a couple of large commercial centres); why should any section of the community be called upon to meet the colossal expense of maintenance caused by traffic in connection with commerce, which not only benefits that section in particular, but the whole country in general? The idea is absurd; it is too parochial.

The funds therefore necessary for the upkeep of State roads should be acquired by Imperial taxation.

COUNTY ROADS.

I will now deal with roads in a different category—roads which cannot be described as State, but the connecting links.

The classification of such roads should be in the hands of the county authorities, and the result would be the incorporation of many miles of district roads at present directly controlled by the borough, urban and rural councils; and when so classified, all powers of local government should be transferred to the county councils acting as the local authorities.

I can conceive the possibility of disputes arising between local and county authority as to whether or not a certain road should be classified as "county," but in such an event there should exist the right of appeal to the Road Board, whose decision should be final. It should be incumbent upon the local authority, for the time being at any rate, to maintain such roads themselves, in which event they would act as contracting parties with the county councils; but the policy to be pursued should be in the hands of the county authorities. And the cost? In my view, this should be met by the levy of a county rate, which would result in an equitable charge upon the individual authorities concerned.

There should also be in the hands of the Road Board funds derived from sources as at present existing from which loans could be made to county authorities for special work of improvement, and such loans should in special cases be within reach of the minor authority.

DISTRICT ROADS.

The only roads now left for consideration are the purely local or district roads, roads which by their very nature carry only light and local traffic. Such roads should remain vested entirely in the borough, urban and rural councils, the cost of maintenance should be a district charge, and the policy to be adopted should remain in the absolute discretion of those councils.

I admit the suggestions put forward are drastic, very progressive, and it may be said Utopian. I can readily understand that proposals of the kind would invoke heated opposition on the part of local authorities of the country, who are naturally jealous of their powers, but I say emphatically, unless we alter our present cumbersome system of local administration in some way or another, we shall surely fail in the march of progress. It will involve the necessity for an Act of Parliament it is true, and the sooner our legislators, and in particular the Ministry of Reconstruction, see the wisdom of such a course, the better for the country, in my humble view.

There are many side issues to be taken into account in connection with a proposal of this kind, issues which would have a direct bearing on the efficient working of the scheme, one in particular being town planning. No scheme of this kind should be brought into operation until considered by the Road Board in relation to State roads, or by the county councils in relation to county roads.

THE PERIOD OF RECONSTRUCTION.

The termination of the war will herald the resuscitation of building enterprise and the development of private estates. Here again the Private Street Works Act needs stimulating. The Act should not be an adoptive Act, and ought to be so amended as to impose upon the owner of land the duty of constructing roads before building houses, and any scheme of the kind should require the approval of the Road Board or county council, as in the case of town-planning schemes.

The period of reconstruction will undoubtedly tax to the uttermost the capacity of the road material producer, and it will probably be necessary for years to come to regulate and control the output. But this should be done by the Central Authority controlling the schemes of reconstruction, the Road Board. The demand for materials of all description will be so great that only a small proportion of the requirements of local authorities will be satisfied for probably two or three years after the close of hostilities, and I doubt even if this period will restore the equilibrium.

The effect, too, of the proposals I make in general is likely to revolutionise the class of production, and even without such proposals the effect will be the same.

Municipal authorities are not likely to revert to the old water-bound methods to the extent that prevailed in former times. The roads of the country will have deteriorated to such an extent that in the majority of cases entire reconstruction will be found necessary, and unless some efficient control of production is inaugurated the markets will assume a condition of chaos; some districts will receive more than their quota, while others will be starved.

The more one considers the requirements of the future, the more it becomes apparent of the necessity for comprehensive

* From a paper read at a meeting of the Institution of Municipal Engineers held at Oxted.

control of policy, of some central guiding advisory authority; otherwise the inefficient expenditure of public funds will in the aggregate result in an immense waste of money—and here let me add a word in the interests of the producer. Whatever form of control is assumed, it should not in any way interfere with the inventive genius of the commercial producer. Most of our modern forms of road construction have resulted from years of experiment and study by the manufacturer and the producer, and at an exceptionally heavy cost. It is not fair to commercial enterprise to attempt in any way to stifle this healthy form of inventive competition, and it is too costly a risk to set up experimental departments at the public expense. Subsidise by all means, but do not seek to destroy this inventive genius by so regulating its destiny as to ultimately rob it of its just reward—profit.

TRAFFIC PROBLEMS.

A word or two on traffic problems may not be inappropriate, but time will only permit the fringe of this important topic to be touched.

I am afraid that highway authorities in general are inclined to be prejudiced against most forms of modern traffic—there is nothing exceptional in this, as we are a conservative people and sceptical of new ideas, especially where our individual pockets are concerned. The prejudices must be broken, otherwise we shall not progress—we shall not accomplish what the altered conditions of life after the war will demand. So long, however, as legislation remains as it is, so long will this prejudice continue.

The imposition of special taxation on motor traffic, especially 'bus traffic, is a very difficult problem, and I fail to see how we can limit taxation in future to any particular class of petrol or gas-driven vehicle. In fact the subject is of such national importance as to warrant the setting up of a Commission of Inquiry. Certainly something must be done to regulate the class and weight of vehicles, more especially locomotives using the various classes of roads, and the terms of reference to such an inquiry might also extend to inquiring into the desirability and practicability of standardising vehicles in connection with the particular purpose for which they are required. Such is my conception of what the future will demand.

HOUSING NOW AND AFTER THE WAR.

£8,000,000 SCHEME FOR DUBLIN.

Mr. P. C. Cowan, chief engineering inspector of the Local Government Board for Ireland, has submitted a report to the Chief Secretary on housing in Dublin suggesting a scheme providing for the erection of 16,500 new houses, and the reconstruction of 3,800 old tenement houses. The cost of the whole work is estimated at £8,640,000.

LOCAL AUTHORITIES' PROPOSALS.

Mr. Hayes Fisher, the President of the Local Government Board, stated in the House of Commons that the preparation of a return of the information obtained last year from local authorities showing in each case the shortage of houses in their areas, the number of vacant houses, and the number of houses for which each authority was willing to prepare a building scheme would not be justifiable. The information supplied by the local authorities was frequently not in a form which lent itself to statistical treatment. The position had also been modified in a number of cases after correspondence or local conferences or otherwise, and the publication of the return suggested might lead to erroneous inferences.

THE PROBLEM IN RURAL DISTRICTS.

In a lecture on "Rural Housing" at the Agricultural Club, Mr. Lawrence Weaver said there was general agreement among authorities on the question that at the end of 1919 at least 500,000 houses would be wanted, and wanted in a year from then. Labour and material would be short, and some new and central organisation was needed to manage this stupendous undertaking. He thought there was justification for the Board of Agriculture being concerned with the work, and that there should be housing commissioners for areas of, say, three or four counties. The problem of rural cottage rents would have to be solved, whether an economic rent was paid or not. He maintained that only a strong department could deal with the claims for priority that would be made as between different districts and different classes of houses.

Mr A. Burton, borough surveyor of Stoke-on-Trent, has received instructions to prepare a housing scheme.

Durham Town Council propose to build 100 houses and also to apply for sanction to prepare a town-planning scheme.

Newcastle-on-Tyne City Council have confirmed a recommendation to appropriate an area of 116 acres at Walker, which, if developed on the basis of fifteen houses to the acre, will secure the provision of 1,740 dwellings.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter X, combinations such as X.Y.Z., and words such as "engineer" and "surveyor," should never be used.*

Dangerous Wall.—"Vivian" writes: The wall separating the back gardens of two houses in this (urban) district is in a very ruinous state. The wall is on private land, and does not adjoin or abut on any street, but in the opinion of the council's surveyor it is dangerous to the tenants of the houses, though not to the public. Can the council compel the owner to repair it, and if so what proceedings should be taken?

Yes. Under Sec. 75 of the Towns Improvement Clauses Act, 1847, it is the duty of the surveyor to give notice to the owner of the wall, requiring him to repair it. A copy of the notice should also be fixed to the wall. If the repairs are not begun within three days after the giving of the notice, the owner can be summoned before the magistrates, who have power to order him to do the repairs within a specified time. If the order is not obeyed, it will be the duty of the council to do the work, the expense of which will be payable by the owner. See *Mellor* v. *Warden and Another* (40 Sol. J. 567).

Repair of Footbridges.—"J. P." writes: "W. H. F.'s" question [The Surveyor, July 5th] is of great public importance, and the reply does not appear quite conclusive. There are numerous cases of footbridges crossing streams in connection with paths over which the public have the right of user, but which are not reparable by the public. It seems inconsistent that a council should be liable for repairs to a bridge, and not the adjoining path referred to. Neither Sec. 13 (2) of the 1894 Act, nor the Highway Act of 1835 render this clear. Mr. Conder's reply indicates that the parish council *may*, but the rural district council *must* effect such repairs. Is this so?

I understand "W. H. F.'s" query to refer to foot-bridges in connection with footpaths reparable by the public. Of course a district council are under no obligation to repair a foot-bridge unless it is part of a footpath reparable by them; nor can a parish council repair a foot-bridge which is not part of a public footpath. On the other hand, where a foot-bridge does form part of a public footpath the parish council *may* repair it, whether the footpath is reparable by the public or not.

Retaining Wall.—"Ynys" writes: A retaining wall supporting land adjoining a highway in this urban area is gradually being pressed outwardly by the weight of the earth behind, and there is a danger of its collapsing one day on to the highway. The wall referred to is marked B in sketch. I understand that under the Highway Act, 1835, walls supporting a road such as the one in sketch marked A are considered as "retaining" walls, and belong to the road authority, and that walls such as the dilapidated one in question, marked B on sketch, which prevent

the soil from falling on to the highway, and therefore "sustaining," rightfully belong to the owner of the adjoining land. I (the surveyor to the council) deem the wall to be in a ruinous state and dangerous to passengers, and would be glad of your opinion as to—(*a*) Whether the wall marked B rightfully belongs to the owner of the adjoining land, and, if so, (*b*) whether sec. 75 of the Towns Improvement Clauses Act, 1847, applies? (*c*) If not, how can the repairs be secured? (*d*) Pending repairs, have the council the right to put up a hoarding and charge the cost to the owners? I may add that when the wall subsided, some years ago, it was rebuilt by the then owners of the land.

(*a*) The ownership of the wall depends upon the ownership of the land on which it stands. If such land belongs to the owner of the adjoining land the wall also belongs to him. The question is one of fact. (*b*) Yes, this section applies, whoever is the owner of the wall. (*d*) Yes, under the section referred to it is the duty of the surveyor to the council to "immediately" cause a proper hoard or fence to be put up for the protection of passengers, and the expense thereof is recoverable from the owner of the wall. N.B.—The Act of 1835 does not contain any provision as to the repair of walls, but the easement of support derived from a "retaining" wall (such as that marked A) implies, in the absence of proof to the contrary, a duty on the part of the highway authority to repair it. There is no such implied duty with respect to a "sustaining" wall (such as that marked B).

Horse Hire v. Purchase.—Woolwich Borough Council Works Committee have considered the question of the purchase of additional horses in view of the high price now being paid for horse-hire—viz., 11s. 6d. per day. Even at the high price now paid for horses, there will be a saving of from £55 to £60 per annum per horse purchased compared with the amount paid for the hire of the horse, and it has been decided that a sum not exceeding £1,500 be expended in the purchase of new horses.

Materials and Construction in Housing Schemes.*

By W. E. H. BURTON, assoc.m.inst.c.e., Engineer to the West Riding Asylums Board.

For the construction of the many dwellings required to be built to house the working classes it is essential that no materials should be selected but what are of proved reliability and these utilised only in sound construction. The element of cost dictates that no effort should be spared to secure any economy possible either in materials or labour. The buildings may have to be plain, but they must nevertheless be substantial, and good proportions relied on rather than embellishment to give refinement. The average tenant has little respect for his landlord's property, and with the local authority acting in that capacity he will in all probability have still less, and much wear and tear should therefore be provided for. Tricky planning involving the adoption of flimsy construction is to be avoided, and care taken that joinery details, particularly kitchen and scullery fittings, have some solidity about them. There is little likelihood that we shall see startling innovations either in materials or construction for grappling with the vast amount of building work awaiting the end of the war, and it will be necessary to put to their best possible use those with which we are now familiar.

TIMBER.

Material obtainable locally should always receive preference, for not only is the cost of transit reduced, but each can be more deftly handled in the locality in which it is to be found. The depletion of shipping will restrict supplies of timber for a long time to come, and the use of Portland cement will need extending in every possible direction to fill the gap. It is improbable that the use of timber can be much curtailed so far as the construction of windows, doors and internal fittings are concerned, but undoubtedly great savings can be effected by using more sparingly in floors and roofs, and by reducing in size or eliminating altogether skirtings and architraves.

When shipping facilities are restored, more attention should be directed than formerly to the excellent timber grown in North America. In the past our chief supplies have been drawn from the Baltic ports, and by-laws in regard to the sizes of timber for floors and roofs have been framed to meet the quality of timber and scantlings commonly shipped thence. With the exception of pitch pine, very little timber has entered this country from North America, though large quantities have been shipped to Europe. This is largely due to a too exacting adherence to the dimensions prescribed by by-laws; American timber being cut to sizes in the green, on becoming dry gives scantlings less than the market sizes imported from the Baltic. It should be borne in mind, however, that general species of American timber (Southern yellow pine and Douglas fir) are from 50 per cent to 25 per cent stronger than Baltic red wood, and due provision should be made to allow their use.

BRICK.

Brick is pretty certain to retain the position it has held for centuries as the chief material used in general building construction. Suitable clays for brick making are to be found in almost every portion of the country, and the cost of production is but small. In the hands of a skilful designer, no material lends itself to such infinite variation, particularly so when coupled with a discreet use of purpose made and moulded bricks. Their size might with advantage be standardised, as considerable variations obtained in different parts of the country. A return to a brick slightly less rather than over 3 in. in depth, for example the standard suggested by the Royal Institute of British Architects, 9 in. by $4\frac{3}{8}$ in. by $2\frac{11}{16}$ in., would considerably add to the appearance of brickwork, especially when in large masses, though the labour expended in walling might be somewhat increased. There is frequently a tendency to match bricks for colour too carefully, whereas the charm of brickwork lies in the diversity of hue it is capable of rendering. For depressing monotony there is nothing to compare with a wall built in first quality pressed bricks, each brick perfect in shape and matched to colour. While bricks must be selected for hardness and durability, every advantage should be taken of variation in colour and texture.

If it is desired to use a brick of poor weathering quality in the external walling, a good thick coating of cement (not lime) rough cast would enable this to be done and at the same time introduce variety of treatment.

STONE.

Stone does not lend itself to cheap building except in districts where it abounds and there happens to be an absence of clay suitable for brickmaking. Thicker walls and considerably more labour are required in its use, and variety is difficult of achievement, except at greatly increased cost. The elevation of the typical working class dwelling erected in stone has little to commend it, and once begrimed with soot the meanest brick erection cannot vie with it for ugliness. Stone is an excellent material for giving relief to brickwork by way of dressings, but anything in the nature of buildings with mean brick backs and glaring stone fronts should be avoided. Brick chimney stacks can have their weather-resisting properties added to with advantage if finished with a stone cap formed in one stone where possible, and pierced for the flues. When flue linings are adopted, chimney pots may be dispensed with if the linings are allowed to project a few inches above the cap.

Something must be said for the sparing introduction of terra-cotta, particularly the light coloured productions such as "Marmo," in districts where by reason of their industries a smoky atmosphere cannot be avoided. This material lends itself admirably for such situations, owing to its adaptability for periodic cleansing and rejuvenating. For a dampcourse reasonable in cost and easy to lay there is nothing to equal a good grade bitumen sheeting, as it possesses sufficient elasticity to allow a certain amount of settlement in a building without impairing its efficiency. This material should never be omitted under the copings of parapets or other walls projecting above the roof.

The smoke question will be more seriously dealt with before long, not only in the interest of the public health, but in the steps taken to conserve the country's most valuable asset, coal. In all the houses about to be built, in order to further that end, the advisability of using gas for both cooking and warming cannot be too strongly emphasised, and every facility should be afforded for this by making proper provision when houses are in course of erection.

The universal use of electricity for lighting, power, warming and cooking is not likely to become an accomplished fact just yet. This is, however, only a matter of time, and with its advent will disappear the bulky and costly chimney-stack, and other means of securing ventilation will then have to be devised. By constructing fireplaces or internal walls better draught is obtained and a considerable amount of heat conserved.

PORTLAND CEMENT.

The material of the future will undoubtedly be Portland cement, and it is to be desired that it will be placed upon the market at considerably lower figures than have prevailed in the past, especially seeing that the raw materials for its manufacture are to be obtained in vast quantities at little cost. The adoption of a standard specification has secured a thoroughly reliable article, and it should gradually supersede lime, not only in concrete, but in mortar and stucco, and all other purposes for which lime is used. Lime is frequently mixed with too great a proportion of sand and ashes to admit of a satisfactory mortar resulting. It has been shown by analyses that the chief factor in the general excellence of the mortar used by the early builder was that they fixed the ratio of lime to sand at about 1 to 2, and selected a coarser aggregate than is customarily used to-day. If a ratio of more than 1 to 3 is adopted, Portland cement with the addition of about 3 per cent hydrated lime should be substituted for lime alone, and its use is always advisable for cavity walling and half-brick internal walls. In the manufacture of artificial stone, it has brought about a high state of perfection, and further developments in this industry will follow.

It is unlikely that reinforced concrete will be used to any great extent in the construction of dwelling houses, as its application would necessarily be on too limited a scale to produce economical results on the outlay. It might, however, be more frequently used for roofing bays and projecting spurs in substitution for timber and lead. Bay windows require to be of much more solid construction than has hitherto prevailed in many towns, and anything in the nature of the foreign ready-made stuck-on type should be avoided. In the form of blocks concrete makes a cheap and useful material where a suitable aggregate can be found and there is an absence of brick or building stone. The cavity wall system of construction is to be preferred to the hollow block, particularly in exposed situations. Used on a large scale, however, it would be difficult to avoid monotony owing to the necessity of having the sizes of all openings standardised. The dimensions of the blocks customarily used are somewhat large and rather out of proportion to the scale of the buildings. Having regard to the scarcity of timber, flat roofs of reinforced concrete might be introduced with advantage in certain situations and would lend fresh scope for architectural treatment. This type of roof can be made perfectly watertight by finishing with a $\frac{3}{4}$-in. floating of cement mortar (1 to 2) to which 5 per cent of Pudlo has been added. There is rarely any occasion to incur the expense that a covering of rock asphalt entails. When there is a likelihood of any settlement, it is advisable to cover with Ruberoid or other similar sheeting.

* Paper read at a North-Eastern District meeting of the Institution of Municipal and County Engineers held at Bradford.

Light forms of concrete and timber construction such as have been adopted in the United States are not likely to find favour in this country, except in buildings of a purely temporary character. A recent form known as the "concrete stud and cement stucco construction" consists of a skeleton frame of timber studs with 1½ in. to 2 in. thick of concrete coating on the outside upon metal lathing, while the inside is lathed and plastered. A wood frame, consisting of studs, joists and rafters, is erected in the usual manner of building the skeleton of a frame house. Every fourth stud is doubled, allowing a 3-in. by 4-in. space, which is filled with concrete to form a concrete stud. At the second floor and roof levels a ledger board, with bottom attached, is placed over the studs, and so arranged that when filled with concrete they form beams which, with the vertical concrete studs, make a homogeneous concrete frame. The floors consist of timber joists and floor boards. The roofs are boarded and covered with asbestos sheeting or other light form of covering.

Considerable advancement has been made in the States with the poured concrete method of house construction. The houses constructed in this manner, however, are unfortunately devoid of any architectural pretensions, and are in short little better than concrete boxes. The walls are of solid concrete some 6 in. thick, reinforced horizontally and vertically, while the floors are of the usual reinforced slab and beam construction. The roofs are of timber and covered with asbestos sheets.

ROOFING MATERIALS.

For a roofing material, coarse Westmorland slates have no equal either for life or appearance, but their cost makes them practically prohibitive. Welsh slates, on the other hand, are comparatively cheap, but the colour is not pleasing, and their use in any quantity has a depressing effect upon a landscape.

Given sufficient pitch (40 deg. to 45 deg.) and not less than 3-in. lap, tiles are quite satisfactory, and can be used with effect, but, as in the case of brickwork, uniformity of colour is to be avoided. The old-fashioned hand-made pantiles are usually too porous and should not be used except on steep pitches. When pantiles are adopted in exposed situations, the spars should be covered before the tile laths are fixed with waterproof felting. On tile roofs there should be no flattening of the pitch at the eaves, or speedy trouble will ensue owing to tiles scaling off. Overhanging eaves should be adopted wherever possible, as they very considerably assist in protecting the walls from the weather. They must not, however, be allowed to project to such an extent as to affect the lighting of the rooms.

Many varieties of artificial slates made from cement and asbestos are now on the market and have proved satisfactory. Unfortunately, they give a flat and symmetrical appearance, and used on a large scale the effect would not be pleasing.

Grey or stone slates make an extremely durable covering, but their weight necessitates stronger roof timbers, and they are consequently unlikely to find favour except in those localities in which they are to be found.

INSIDE TREATMENT.

So far as the inside treatment of buildings is concerned, there is scope for a much more extensive use of wall board and similar products than has yet prevailed. Ceilings might with advantage be constructed of this material, and thus obviate the cracked and unsightly appearance frequently resulting from the use of plaster. Where plaster is used for ceilings, it should be upon a foundation of expanded metal in preference to wood laths. Stud partitions are things of the past now that so many excellent and light forms of slab partitions are available. Though the first cost is somewhat more, it will probably be found more satisfactory in the long run to render walls with Portland cement and finish with Parian cement or other ganged plaster in place of the usual three coats plaster.

Wood staff beads are thereby dispensed with, and it will also be found good practice to bullnose slightly external angles. Two-coat plaster work is rarely if ever satisfactory. There should be no plaster cornices, but picture moulds should be provided in every room to obviate as far as possible the driving of nails into the walls. The walls of scullcries and larders are better left unplastered. The bricks should be carefully selected for shape, and the joints neatly struck.

The inside plumber's work merits more attention than it commonly receives when plans are in the initial stage of preparation. The run of every pipe should be carefully thought out and indicated upon the drawings, and not left to be devised as an after-thought, when the structure is completed. All pipes should be made easily accessible by being run as far as possible on the face of the walls. In every scullery there should be provided a white glazed sink not less than 6 in. deep, with draining board at which a plentiful supply of hot water should be available. A gas set pot should invariably be fitted in preference to the obsolete brick contrivance which took up too much valuable space.

As regards the joiner's work, thin stuff must never be countenanced. Doors and windows should not be less than 1¾ in., and 2 in. is desirable. If casement windows are adopted, construct them with a sash over, made to open so as to admit of ventilation in weather when an open casement would be out of the question. Skirtings can be omitted when the walls are finished with a hard plaster. A 2-in. by 2-in. convex fillet is all that is necessary. Where architraves or cover moulds are required, let the mouldings be simple and bold with an absence of smaller members. Shelves and cupboards should be constructed wherever it is possible to fit them, and a dresser and plate-rack not forgotten in the kitchen.

STANDARDISATION.

One word in regard to standardisation, of which much is heard to-day. Highly desirable as this may be in the case of bricks, tiles, ranges, registers, baths and fittings generally, and possibly internal doors, anything that would tend to standardise window and external door openings and restrict the free treatment of elevations must not be countenanced.

It is imperative that savings must be effected wherever possible, both in materials and labour, and the fullest advantage taken of what standardisation has to offer, but never let it be forgotten that the worker has a soul and requires something more than four walls and a roof for a dwelling, be the materials and construction ever so perfect. Standardise the component parts and construction of a building by all means, but give the craftsman a chance to show his hand in putting them together. Excessive standardisation would prove too great a temptation for slavish copying, and however pleasing the unit design might be, to have it mechanically repeated hundreds if not thousands of times up and down the country like the stamping of trees upon an ordnance sheet would be to reduce a creation of beauty to so many eyesores.

CONSTRUCTIONAL DETAILS.

The following details of construction will, if adopted, be found to give satisfactory results:—

Foundations.—Portland cement concrete should be used in all foundations, and brick footings dispensed with. In mining districts where subsidence is likely, disused wire ropes, obtained practically for the asking from any colliery, make excellent reinforcement for the foundation concrete. Wall junctions and returns should be treated as in reinforced concrete.

External Walls.—To be 10 in. thick, built of brick in stretcher bond with 1 in. cavity. Two stout galvanised wire ties in every superficial yard of wall placed checkerwise. The cavity to extend 6 in. below the dampcourse. Bitumen sheet dampcoursing to be laid over all window and door heads, the full width of external wall and cavity, and turned up 3 in. at internal wall. Where the heads extend the full thickness of the wall, the upper surface in the cavity requires to be grooved to falls, and the back cement rendered. Efficient supervision is necessary to see that this construction is faithfully executed. For one and two storey dwelling houses it has been found to answer satisfactorily in the most exposed situations. Brick walls built solid unless more than 14 in. in thickness are less effective in resisting driving rain particularly when the joints are well flushed up.

Lintels, &c.—Reinforced concrete lintels should be used over door and window openings in place of wood, and obviate the necessity for relieving arches. Concrete lintels should also be used for fireplace openings, and trimmer arches replaced by concrete hearths. Coke breeze fixing bricks should take the place of wood bricks and strips for attaching joinery fittings.

Floors.—Joisted floors at ground level should be dispensed with. Lay 4-in. cement concrete (1-2-4) and float 1-in. thick with cement mortar (1-2), to which 5 per cent Pudlo has been added. Where wood finish is desired, cover with 2-in. breeze concrete (1-4) to which floor boards can be nailed. Kitchen, scullcries and larders to be finished with cement and granite chippings (1-2) finished equal to a polished flag, or if desired, lay tile quarries or natural flags. With such construction, freedom from vermin is practically assured whilst liability to dry rot is reduced to a minimum.

In regard to the first floor, reinforced concrete has not yet become a practical proposition for the construction of floors, so far as the average dwelling house is concerned. It might be feasible, however, by adopting a continuous mesh reinforcement, to floor a complete block of dwellings in one operation at comparatively low cost. What certainly is required is a material with which to finish such a floor, which shall at the same time be cheap, warm to the feet, resilient and durable. With such a finish carpets might largely be dispensed with and improved sanitary conditions secured.

Internal Walls.—Finish with Parian cement ⅛-in. thick hand floated upon a backing of Portland cement (1-3). All external angles to be rounded. The best decorative finish for walls of this character is flat oil paint or a washable distemper. The use of an insanitary material such as wallpaper is thus avoided and the surface can from time to time be scrubbed down with soap and water and thoroughly cleansed.

The Editor will be glad to receive copies of annual and other reports dealing with matters of interest to "Surveyor" readers.

Institution of Municipal and County Engineers.

MEETING AT MAIDSTONE: DISCUSSION OF PAPERS.

The members of the South-Eastern District of the Institution of Municipal and County Engineers met in large numbers at Maidstone on Saturday, the 27th ult., for the discussion of the following papers: "Municipal Works in Maidstone During Past Twenty-five Years," by Mr. T. F. Bunting, borough engineer and surveyor of the borough; "Kent Roads Before, During, and After the War," by Mr. H. T. Chapman, county surveyor of Kent*; and "Some Notes on the Maidstone Borough Electricity Works," by Mr. E. E. Hoadley, borough electrical engineer. At the town hall, where the assembly took place at 12 o'clock, the chair was taken in the first instance by the mayor (Councillor George Foster Clark), who was supported by Messrs. T. W. A. Hayward, M.INST.C.E., president of the institution, H. T. Chapman (county surveyor, Kent), chairman of the South-Eastern District, T. F. Bunting, E. E. Hoadley, F. J. Wood (county surveyor, East Sussex), A. Dryland (county surveyor, Surrey), W. T. Harrison (Folkestone), J. S. Green (Hythe), R. L. Honey (Chatham), F. C. Greig (Kew), J. L. Redfern (Gillingham), S. Percy Andrews (Faversham), J. A. Mitchell (Northfleet), J. Potter (Maidstone), D. E. Foster (Eastry), W. Goodsell (Eastry), A. E. Wilson, J. L. Parkis (Walsall), J. Hookins (Dartford), F. W. Pullen (East Ashford), S. Sladden (Bridge Rural), W. Banks (Rochester), G. Marlow Reed (Middlesex County Council), W. Morling (Maidstone), W. Terrill (Ashford), E. C. Pearcy (Sittingbourne), M. Harvey (Milton Regis), J. Kitney (Hollingbourne), R. J. Jenkins (Portsmouth), W. C. Sillitoe (Ealing), S. W. Barnes (Hanwell), E. Vaughan (Maidstone), H. R. Crabb (Sheerness), H. Blewett (Mutford and Lothingland), C. A. Till (Isle of Sheppey), W. Jackling (Maidstone), F. W. Ruck (Maidstone), W. L. Bradley (Tonbridge), E. Annett (Gillingham), D. K. Drury (Gillingham), W. Smith (Gillingham), T. A. Busbridge (Maidstone Rural), F. B. J. Stephens (Deptford), and P. Gilbert (Crayford).

The MAYOR, in welcoming the members, remarked that from his experience he could say of municipal officials that they had a particularly high sense of duty, and he thought the community was under obligations to them for the amount of valuable work they carried through. They were subjected to a great deal of criticism, but they must have satisfaction in the knowledge that they did their work well.

The PRESIDENT returned thanks to the Mayor, and said he had known the borough engineer of Maidstone long enough to know he was a man of exceptional ability, one who knew his business and carried it out in a thorough, business-like way. Thirty years ago, when the members of the institution visited Maidstone, the borough engineer was a gentleman whom they much respected, and who later on became president of the institution. He (Mr. Hayward) ventured to hope that, following such a precedent, the members might be invited to Maidstone on some future occasion to greet Mr. Bunting as their president. No man would fill the position with greater dignity or with more honour to the profession than he would. Mr. Bunting was a good and faithful municipal engineer, and he had inherited in a great degree, and maintained to the fullest degree, the great quality of municipal engineers—viz., modesty.

Before vacating the chair in favour of Mr. Hayward, the MAYOR added a sentence in support of Mr. Hayward's description of Mr. Bunting. The town council, he said, placed the highest possible value upon that gentleman's services. He considered Maidstone was most fortunate in having Mr. Bunting as its borough engineer.

The PRESIDENT having invited supplementary or explanatory statements from the authors of the papers,

Mr. HOADLEY said he would like to add that in Maidstone they were rather proud of their electricity supply. Though it might not be a large town in point of view of population, it was large from the electricity point of view. In explanation of the condition in which the visitors would find the works, he stated that extensions to cost between £25,000 and £26,000 were being carried out with practically no men. Mr. Hoadley then proceeded to describe the type of turbine that had been installed and another that was to be supplied in the course of two or three months.

Mr. A. DRYLAND (Surrey) moved a vote of thanks to the authors of the papers, and with respect to the reference made by Mr. Bunting to Stuart's granolithic pavement, said he noticed the loan for this had been paid off. He would like to know the period of the loan. With respect to the tramways, he noticed that the traffic revenue per car mile was a little over 10d., which struck him as being very small. He would like to know what provision had been made for reconstruction. They had recently had that question before them near London and came to the conclusion that it represented something like 3d. per car mile. He noticed that Mr. Bunting stated that the district rate had been kept very low. Had any provision been made for the reinstatement of the roads, a subject which Mr. Chapman had dealt with in his paper? If no provision had been made at Maidstone, it would be found that this was an item that would jump up after the war. He was now informed, however, that the county council paid, and that, of course, altered the case. Mr. Chapman stated that he expected to have his hands full after the war, as most of them would have. He alluded in his paper to the cost of laying and maintaining tarred slag macadam. Taking the average at 10½d. per square yard per annum, it would be interesting to know how that compared per ton mile with other forms of carrying traffic such as railways. Mr, Chapman also said a good deal about concrete roads. Surveyors were reproached because they had not launched out more into concrete for road surfacing, and they were told how many thousands of miles had been laid down in America. He (Mr. Dryland) thought that people who reproached them did not give enough weight to the conditions under which they worked in this country. The American examples were practically new constructions, and if similar conditions obtained in this country they would no doubt go in for concrete, if not for surfacing, for foundations, for this they could do at a little extra cost and with efficiency. But British surveyors were largely engaged in reconstructing roads which existed and which had something of a foundation and very often an adequate one. It had also to be considered that in works upon such roads the traffic had to be carried on the whole time. It was a very great drawback if traffic had to be shut off for a month; whereas with tar-macadam it could be resumed in a few hours. They had to consider things as they were, and not as they might be in America. It would probably be wise when it was found advisable to go in for a ferro-concrete bottom to lay the finished or wearing surface 3 in. below the ultimate level, so that a surfacing coat might afterwards be laid upon it after a few years' traffic had been on the concrete. As to what would have to be done after the war, he thought they were all agreed that we should put more capital into the roads, and treat expenditure which would serve for a long period as capital expenditure. At present we were trying to do everything out of maintenance and restricting the quantity of work to be done. The only way to deal with a great deal of the work, so much of it of a permanent character, was by way of loan, the term to be well within the life of the road. From the experience of the Road Board they were in a position to obtain data of the life of a road subject to such traffic as was likely to be dealt with after the war.

Mr. F. J. WOOD (East Sussex) associated himself with the vote of thanks, and remarked that Mr. Bunting had shown he had done a great deal of work, evidently in such a way that every borough engineer should try to do his work. It was rather curious to him (the speaker) to find that Mr. Chapman's experience with respect to the loss of roadmen was the same as in East Sussex, the percentage being something like 60 per cent. With respect to concrete, he (Mr. Wood) had not had the opportunity of trying such foundations on roads which were in maintenance. He had made them in new roads, but up to date he had not had the opportunity of finding whether they had proved satisfactory. It was a curious material to deal with, and unless it was thoroughly well laid by men accustomed to such work there would, he feared, be more failures than successes. He found the best method of laying concrete was to mix the sand and cement together in a dry state before mixing with the aggregate. He agreed that when they were considering their road policy they should determine that what was to be done should be done properly. If roads had no foundations they should be put in, and it was also essential that the road should have thorough drainage. Unless this latter consideration was attended to it would be very little use putting good foundations in or a superior surface.

Mr. J. L. REDFERN (Gillingham) could not help thinking that the variety of the work Mr. Bunting had had to undertake showed how varied must be the capacity of the municipal engineer in modern times. He was one of those who believed that the variety of the work was its best charm. He liked changes, for they added zest to life and tended to keep up enthusiasm, and it was important that they should be enthusiastic if they were to succeed as municipal engineers. He noticed that in Maidstone they had acquired a site for a small-pox hospital. At Gillingham they acquired a site for such an hospital well out in the country, but it was not long before the speculative builder found it was a most suitable spot for his operations, and the consequence was, the small-pox hospital site was soon surrounded by plots and dwellings. As a result the corporation had had to make arrangements with an adjoining town to take small-pox cases, and make use of the site for other purposes. Touching on another question, he would like to know the period

* See last week's issue, p. 63.

of the loan for foot pavements. Perhaps Mr. Bunting would also say whether he had had trouble with the cleansing of the sewage filters, and whether they were giving satisfactory results. Also, had any attempt been made to sell the sludge? At Gillingham the whole of the sludge was taken away, £60 paid for it, and the farmers who took it by contract spoke highly of the result. They had disposed of it in this manner for the last twelve years. It was gratifying to find that Maidstone was so progressive in housing and town planning. At Gillingham they had a small housing scheme, but the corporation were naturally a bit nervous that after this war there might be a slump, as there was after the Boer War, when the dockyards were cut down. He should like to know what the price of the allotment plot was. Mr. Redfern expressed his appreciation of Mr. Bunting's remarks with respect to ancient buildings, and, referring to Mr. Chapman's paper, observed that before the war some of them got away from local materials, owing to the facilities for obtaining imported stone, but now they found that the local stone could be utilised, particularly in combination with tar. He used large flints in combination and for finishing a road prior to carpeting with better material. He thought they did a county good if they utilised all the materials that were found within its borders. He did not know if they were going back after the war to the heavy traffic of pre-war times, but he was inclined to think they would not get the same stress on the roads in the future. He hoped, for one thing, that aërial transit would be so developed that the roads would begin to feel the benefit. He would like to ask Mr. Hoadley the price charged per unit for heating and power, and also for lighting. He recognised in Mr. Hoadley an enthusiast, and that being so he could not be a failure in municipal work.

Mr. R. L. Honey (Chatham) asked if Mr. Bunting would describe the method he adopted for fencing the allotment.

Mr. Marlow Reed (Middlesex County Council) was of opinion that local authorities should have the power to issue stock for such work as the permanent improvement of the roads.

Mr. J. S. Green (Hythe) in adding his testimony to the value of the papers, expressed the opinion that the members of the institution met far too seldom for the exchange of views with one another. With regard to what had been said by one speaker, he recalled that in Lancashire when the heavy steam wagons came along the local authorities had to meet heavy charges for maintenance and reconstruction. He put down an extent of Durax (for which he had a ten years' loan) and granite setts with a twenty years' loan, and he had heard of a reinforced concrete bed being put down carpeted with tar-slag macadam. Personally he was a great believer in reinforced concrete. He had used it in many of its forms, and he thought there was a future for it. As to local stone, they had a blue lonkey sett in Lancashire, but it would not stand heavy traffic. It used to be "weathered" with a winter's frost before being used. He had to put some down as an experiment with the county surveyor, it being a toss-up whether local granite or the lonkey sett should be used. It was taken from the quarry green and put down, but in less than twelve months the whole of it had to be taken up, and that was the death-knell of the local setts so far as heavy traffic was concerned.

On the invitation of the president, the authors of the three papers agreed to communicate their replies to the secretary in writing.

LUNCHEON AND VISITS.

The company partook of luncheon in the picturesque mediæval Archbishop's Palace, and brief complimentary speeches were made, the president in the course of his remarks making a strong appeal on behalf of the institution Orphan Fund. Subsequently visits were paid to the public baths, the electric light station, and to Messrs. Tilling-Stevens' petrol electric motor works, where tea and refreshments were hospitably offered by the directors. Next the electric sewage pumping station was visited, and here tea was kindly provided by Mrs. H. F. and Miss Chapman, Mrs. and Miss Bunting, Mrs. Ruck and other ladies.

Mr. Hayward's appeal for the Orphan Fund resulted in a subscription of £15 2s., including a donation of £5 from the Mayor of Maidstone.

ABERGAVENNY MEETING PROGRAMME.

A meeting of the Institution of Municipal and County Engineers will be held at Abergavenny to-day and to-morrow, the 16th and 17th inst.

Friday, August 16th.

12.15 p.m.—Meet at town hall.

12.30 p.m.—Reception by the mayor and corporation.

1. 0 p.m.—Luncheon, at invitation of mayor and corporation.

3. 0 p.m.—Discussion on the following paper: "Public Works and Undertakings of Abergavenny," by Mr. Frank Mansfield, borough surveyor.

5. 0 p.m.—Afternoon tea.

Saturday, August 17th.

10. 0 a.m.—Meet at town hall. Proceed to waterworks, calling at service reservoir, Llwynddu, *en route*. The journey will be made by brakes to the Llwynddu Valley; the party will then walk up the valley to the spring chambers, balancing chambers and recorder house, and call at the site of the service reservoir on the return journey. On the way the members will see some of the most beautiful scenery in the district.

INSTITUTION OF MUNICIPAL ENGINEERS.

SOUTHERN DISTRICT MEETING AT OXTED.

A meeting of the Southern District of the Institution of Municipal Engineers was held at Oxted on Saturday last. Those present comprised Messrs. Horace Boot, M.I.Mech.E., M.I.E.E. (London), E. A. Stickland, Assoc.M.Inst.C.E. (Windsor), John Taylor (Uckfield), T. C. Barralet (Godstone), A. G. Tucker (Mayfield), S. R. Drake (Leatherhead), and Captain J. N. Prior, M.C., R.E. (Sevenoaks), members; G. E. Crowter (Godstone), C. Phillips (Godstone), A. Clarke (Coulsdon and Purley), W. Froy (Uckfield), W. E. Hunt (Uckfield), Eng.-Lieut. R. Manton, R.N., visitors; and B. Wyand, secretary of the institution.

Mr. E. A. Stickland occupied the chair at the commencement of the proceedings, vacating it later in favour of Mr. Boot, who was elected chairman of the district for the ensuing year. Mr. T. C. Barralet was elected district vice-chairman.

As regards the hon. secretaryship, it was explained that Mr. Arthur Palmer, the present secretary, was away on active service, and it was felt that he should be re-elected, Mr. John Taylor consenting to accept the office of acting district secretary in his absence.

The first item on the agenda was the nomination of a district vice-president, and the selection was unanimously made of Mr. Barralet.

At the conclusion of the business meeting, two papers, "My Evidence at the Departmental Committee on Building By-laws," by Mr. T. C. Barralet, surveyor, Godstone Rural District Council, and "Roads in War-time and the Aftermath," by Mr. G. E. Crowter, highway surveyor, Godstone Rural District Council, were presented and discussed at length, although, unfortunately, time did not allow of full discussion of Mr. Crowter's paper.

A vote of thanks to the Godstone Rural District Council for granting the use of the room concluded the proceedings, and the members journeyed to Limpsfield Chart and inspected the very excellent municipal cottages which had been erected to the plans and under the supervision of Mr. Barralet.

On returning to Oxted the party were entertained to tea at the invitation of Messrs. Barralet and Taylor.

MOTORS AND MUNICIPAL WORK.

Erith Urban District Council are obtaining estimates for a motor ambulance.

Cupar Town Council have agreed to purchase a tractor to haul the fire engine.

Burnley Electricity Committee are considering the purchase of an electric vehicle.

Birmingham Baths Committee have decided to purchase two motor vehicles at a cost of £350.

Maidstone Town Council have received sanction to purchase a 3½-ton electric tipping wagon at a cost of £1,200.

Tottenham Urban District Council have instructed the fire brigade superintendent to prepare an estimate for a motor fire engine with turbine pump.

Mr. F. A. O. Laing, of Corbridge, has intimated that he intends to present a motor ambulance to the South Shields Town Council for the use of the town.

Salop County Council have adopted a resolution calling for the introduction of legislation for payment of a fair mileage rate by motor omnibus companies to the highway authorities.

Glasgow Corporation Cleansing Committee recommend that for the collection of refuse four additional electric vehicles be purchased—two of 2 tons at approximately £1,168 each and two of 3½ tons at £1,432 each.

Gravesend Corporation's Wharf Scheme.—The Gravesend Corporation are presenting a scheme for the provision of a deep-water wharf, which will enable large ships to be loaded and unloaded at Gravesend. The scheme has the support of the Kent County Council, but it is being opposed by the Port of London Authority.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week. Other reports will be found on our "Local Government Board Inquiries" page.

BUILDINGS.

Devonport T.C.—Plans for the extension of the technical school, at an estimated cost of £20,200, have been sent to the Board of Education for approval.

Manchester T.C.—The Buildings Committee have passed plans for a fire station at Crumpsall.

Surrey C.C.—A proposal by the Public Health Committee that the council should endeavour to secure the use of Cheam small-pox hospital, or, failing that, the use of the Claudon Hospital, for ex-Service men suffering from tuberculosis having been ruled out of order by the chairman (Alderman C. B. Edgar) on the ground that it involved an expenditure which had not been approved by the Finance Committee, Sir Edward Coates promptly expressed his willingness to accept the financial liability. He was supported by practically the whole council, and a form of guarantee having been signed by forty-three members, the difficulty was overcome.

REFUSE COLLECTION AND DISPOSAL.

Dublin T.C.—The Cleansing Committee have prepared a report, pointing out that the filling up of the Fairview sloblands is now reaching its final stages. The committee ask for authority to enter into negotiations with the Port and Docks Board with regard to three alternative schemes by which the disposal of city refuse might be accomplished. One is the formation of a promenade at Clontarf already approved by the council; the second to acquire a section of the foreshore outside the Great Northern Railway embankment from the North Wall Extension to the landing stage of the Clontarf Boat Club, at a cost of £41,000; the third scheme is a modification of the second, the space to be enclosed running from Tolka quay to Haddon-road, the cost being estimated at £33,000.

Foleshill R.D.C.—Mr. James Jackson, district advisory officer, National Salvage Council, wrote that if the council would forward their salvaged materials to Birmingham they would be allowed 25s. per cwt. for old tins, £5 10s. per ton for paper and rags, and £8 per ton for string. The council have referred to the Scavenging Committee a suggestion of Mr. Jackson that, as an inducement to the men engaged in scavenging, a bonus of 1s. 6d. or 1s. 9d. per cwt. collected should be paid; also that a person, either male or female, should be engaged on the tips in sorting.

Poplar B.C.—The salvage of waste material last month was valued at £88 1s. 6d., of which £42 odd was distributed to the dustmen and carmen according to scale.

ROADS AND MATERIALS.

Cardiganshire C.C.—The clerk has been instructed to communicate with the Radnorshire County Council with regard to constructing a road between Cwmystwyth and Rhayader, and with the Breconshire County Council for a road between Tregaron and Abergwesin. The council have also adopted a proposal of the Finance Committee in favour of a light railway along the coast from Aberystwyth to Cardigan.

Cumberland C.C.—The deputy county surveyor reported that in the resurfacing of roads the difficulty of obtaining casual male labour had compelled them to employ women where possible, and this class of labour had been fairly satisfactory. In the Gretna and Longtown districts the Road Board had certified the exemption from military service of men who were forty-one in June, 1916. Up to the present no arrangements had been made by the Treasury for dealing with damage caused by timber traffic other than under the direct order of the Board of Trade. A considerable amount of timber was to be hauled in the Brampton district, and in the event of excessive damage it would be brought to the notice of the Road Board, a representative of which had inspected the roads with him.

Dawlish U.D.C.—The surveyor, Mr. S. F. C. Churchward, has submitted an estimate, at £450, for making up the road leading from Exeter-road to Riviera and Sea Lawn-terrace, so that it might be taken over by the council.

Hythe T.C.—The borough surveyor, Mr. J. S. Green, reported that the tarring of the whole of the main roads was now completed, and the cost per square yard was one penny and a fifth. This included labour, material, and the machine. He could not state the cost of such work last year on Hythe roads, but from his past experience he was quite satisfied with the result achieved at Hythe. He desired to give credit to the foreman and to the workmen. They had worked splendidly, and when credit was due for special work, or indeed for any work, he considered it only fair that the men employed should be given that credit. The council expressed their pleasure at hearing the borough surveyor's statement.

Kensington B.C.—It is proposed to lay substitute bituminous carpeting in Warwick-road, and to use the wood blocks there for repairing purposes on other thoroughfares.

Kesteven C.C.—The county surveyor, Mr. W. B. Purser, reported that the expenditure on main roads for the year ended March 31st last was £4,072 under the estimate. In reviewing the work of the year under report, he pointed out that the work actually done is much less than the expenditure appears to indicate, owing to the very high price of labour and materials. The main roads, as a whole, are standing the strain almost better than could have been expected, and, he believed, compare very favourably with main roads as a whole. The extension of surface-tarring had had very beneficial effects, and would well keep up the roads until they can receive permanent attention. He was afraid it would be impossible to do much this year, owing to the further shortage of labour and materials.

Marylebone B.C.—The borough council have agreed to lay down tar-macadam in Newman-street at an estimated cost of £560, and to recoat the carriageway of Hollam-street, at an estimated cost of £340.

Middlesbrough T.C.—With reference to the proposed main trunk road from Middlesbrough to Redcar, Alderman Poole stated at a meeting of the Plans Committee that the frontagers were usually responsible for the making of roads and thoroughfares, and it would be necessary to get all the landowners *en route* to agree to make the road when they had some prospect of selling the land for building sites. But who would find the money in the first instance? The borough engineer (Mr. S. E. Burgess) said that the road would be laid out in accordance with the plan. The landowners would have to conform to that. He added that a great housing scheme for the workers of Teesside was also necessary.

Newport (Mon.) T.C.—The Admiralty have asked the Tramway Committee to give them the cost of extending the tramways from Messrs. Lysaght's works to the Channel Dry Docks, so as to convey workmen to that district. The engineer reports that a double track would cost £34,517, and a single track with loops £28,517. He adds that the track could be ready in twenty-three weeks. The committee has agreed to contribute the pre-war cost of the line and the cars, and to bear 50 per cent of the working costs, provided the track, equipment and cars become the property of the corporation.

Sheffield T.C.—A linking-up of Sheffield and Chesterfield—12 miles—by tramcar is being arranged, the corporation having entered into an agreement with the Chesterfield Rural Council to construct a tramway to Dronfield.

Surrey C.C.—At the last meeting it was reported that Surrey's share of the Road Board grant was £3,000 a year, and the board preferred to give it to the encouragement of tarring operations on district roads, the grant representing about 21 per cent of the estimated cost of the works. The Road Stone Control Committee has for the current year placed at the disposal of Surrey 70,768 tons, which is 20,403 tons less than last year, and 68 per cent of the quantity asked for.

SEWERAGE AND SEWAGE DISPOSAL.

Dawlish U.D.C.—The council are considering a proposal of the surveyor, Mr. S. F. C. Churchward, for the construction of a relief sewer at Manor-row.

WATER, GAS, AND ELECTRICITY.

Blackburn T.C.—The town council have adopted a scheme for new plant at Greenbank gasworks, at an estimated cost of £6,000.

Cardiganshire C.C.—The council have approved a proposal submitted by the Finance Committee with reference to a scheme for generating electricity from the resources of the rivers Rheidol, Ystwyth, Aeron and Teify.

Doncaster T.C.—The Water Committee have submitted a report stating that consideration is being given to the provision of an additional water supply.

Dungannon R.D.C.—The council have arranged a loan with the Belfast Bank for carrying out the improved water supply scheme.

Redditch U.D.C.—The council have approved a scheme for the extension of the electricity undertaking at a cost of between £50,000 and £60,000.

South Molton R.D.C.—It has been arranged to sink trial pits in connection with the North Molton water supply scheme.

Stoke-on-Trent T.C.—The necessary consent has been received to the borrowing of £7,340 for laying a low-tension direct-current feeder from Bagnall-street sub-station to Hartshill.

MISCELLANEOUS.

East Grinstead R.D.C.—The surveyor, Mr. C. Turton, reported that he had considered the preliminary list of stores which would probably become surplus at the termination of the war, and suggested that the following were likely to be required by the council: Trailers, building material, pumps and fittings, ambulance, lorries, tractors, typewriters, road-making tools, water tanks, hose and piping, weighing machine.

Folkestone T.C.—The borough surveyor, Mr. E. A. Nichols, has been authorised to instal a plant for treating fish livers for extracting oil, at an estimated cost of £250. A permit will have to be obtained in the first instance.

Harrogate T.C.—It has been resolved to establish a municipal piggery at the Ripon-road sewage farm, at a cost not to exceed £1,000 on the building and stock without the sanction of the town council.

Rotherham T.C.—The town council have agreed to seek approval for a cold-storage scheme, the estimated cost of which is £9,491.

Stoke-on-Trent T.C.—It is proposed to instal a waste recovery plant for dealing with condemned meat at the Hanley destructor works, at an estimated cost of £1,750.

PERSONAL.

Mr. F. Hill, acting borough surveyor of Lancaster, has been appointed local fuel overseer.

Mr. E. L. Morgan, borough engineer of Bolton, has had his salary raised from £1,000 to £1,200 a year.

Mr. B. J. Wolfenden, borough engineer of Bootle, has had his salary increased from £600 to £650 a year.

Mr. R. Maxwell, manager to the Gainsborough Rural District Council, has been appointed fuel overseer for the district.

Mr. H. D. Strange, borough engineer and works engineer of Dorchester, has been appointed fuel overseer for the borough.

Mr. W. Jervis, county surveyor of East Suffolk, has had his salary increased from £500 to £600 "in recognition of his ability and exceptional services during the war."

Lieutenant W. H. Eley, surveyor to the Newmarket Urban District Council, has received a cordial welcome from the council after his illness following service in France.

Mr J. B. Ogden, sewage works manager to the Crompton Urban District Council, has had his salary raised from £2 17s. per week to £3 5s. and a war bonus of 5s. per week. The emoluments include a house, coal and gas.

Mr. Eli Richards, chief inspector of the Cardiff waterworks, has received a letter from his youngest son, No. 31399 Corporal Fred Richards, Royal Welsh Fusiliers, stating that he is a prisoner of war in Germany. He was officially posted missing on March 22nd.

WHAT TO DO WITH OLD TINS.

NATIONAL SALVAGE COUNCIL'S INVITATION.

Manufacturers and packers who have accumulations of old tins will find it worth their while to communicate with the Director-General of National Salvage, Caxton House, Tothill-street, before attempting to dispose of them. Tin-box manufacturers throughout the country are also invited to put themselves in touch with the Director-General of National Salvage, who will be pleased to give advice, and, when possible, to bring buyers and sellers into touch with one another.

Owing to the scarcity of new tin plate, the utilisation of old tins by cutting them up and rendering the plate into smaller tins is becoming an important industry, which will help the many trades to which tin boxes are essential, and also relieve those to whom the disposal of old tins was a constant worry.

Old tins should be treated with greater respect than hitherto, and care should be taken to prevent their becoming unnecessarily damaged or rusted by exposure. The collection of "household tin" is still a considerable problem, especially in rural districts, but accumulation of tins at factories can be readily dealt with.

Municipal Employees on Strike.—Manchester and Salford are going uncleansed and unswept owing to a strike of municipal employees. About 2,000 men are doing nothing. The question at issue is whether they should receive a bonus of 12½ per cent in addition to the £1 a week wages advance already paid.

LOCAL GOVERNMENT BOARD INQUIRIES.

The Editor invites the co-operation of Surveyor *readers with a view to making the informaton given under this head as complete and accurate as possible.*

INQUIRY HELD.

Mexborough U.D.C. (July 31st. Mr. P. M. Crosthwaite).—£2,500 for works of water supply.—It was stated that, owing to the shortage of water, and the precarious nature of the present supply, the council proposed to go down to the Oaks Rock, a prolific water-bearing bed of sandstone, which, when the collieries sank through it, was yielding at the rate of over two million gallons a day. Dr. Huey (medical officer), while not opposing the council, said the Oaks Rock scheme was somewhat speculative, and as a neighbouring landowner had offered a plentiful and certain supply from springs on his estate at High Melton, he thought the council should have accepted that offer. The inspector reminded the council of the Treasury's veto on Local Government Board sanctions, and said it was most unlikely that expenditure for anything but vital and urgent purposes would be sanctioned. Alderman Watson replied that he considered that in the council's present unhappy position this expenditure was most vital and urgent.

RECENT PUBLICATIONS.*

From War to Work. By Samuel Turner. Price 1s. 6d. nett. London: Nisbet & Co., Ltd.

This little book forms the contribution of the author towards the solution of some of the most important problems of reconstruction. He deals with such questions as restriction of output, consumption, and the theory of profits, and arrives at the conclusion that, although democracy must learn the lesson of self-discipline, some measure of State control of industry will probably be found necessary after the war. The book contains many thoughtful suggestions with regard to impending social changes.

Sewage in the River Lea—A flow of sewage into the Lea was the subject of a motion heard by Mr. Justice Roche on the 7th inst., on behalf of the Lee Conservancy Board, to restrain the Enfield District Council from allowing sewage to flow into the river just above the metropolitan water supply intake. The sewage, it was stated, came from the Enfield Small Arms factory. Mr. Grant, K.C., for the council, said that the plans were with the War Office, and that his clients were ready to proceed when they were approved. The motion was adjourned for a fortnight.

Maidstone Light Railways.—This undertaking, commenced in 1904 and added to in 1909, now consists of 7¾ miles of single track, serving from the centre of the town to Barming on the west, and Loose and Tovil by two branches to the south. The capital expended to March, 1917, was £100,194. The total revenue for this year stated Mr. T. F. Bunting, the borough engineer and surveyor at the recent Maidstone meeting of the Institution of Municipal and County Engineers, was £11,404, and working expenses £7,576, the nett loss being £753. For the year just ended the undertaking was not a charge upon the rates. In 1917 the average traffic revenue per car per mile was 10·116d. and the working expenses 7·032d. The maintenance of the tramway track is in the hands of the surveyor's department, and the cost of the surface paving is divided between the tramways and Highways departments.

FOR OTHER ADVERTISEMENTS
See End of Paper.

STOURPORT URBAN DISTRICT COUNCIL.
ENGINE DRIVER.

The above Council invite applications for the appointment of Engine Driver at the Sewage Pumping Station. Applicants must be ineligible for service in H.M. Forces, and must have had practical experience in the working and management of gas engines and pumping machinery, and be able to carry out small repairs. A list of the duties may be obtained by forwarding a stamped addressed envelope to the Council's Surveyor, Surveyor's Office, Stourport. Wages £2 15s. per week. Applications, stating age and experience, accompanied by copies of three recent testimonials, should be sent to the undersigned so as to be received not later than August 31st, 1918.

A. D. CAPEL LOFT,
Clerk to the Council.

Stourport.
August 12, 1918. (3,846)

* Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

SURVEYORS' SALARIES.

To the Editor of The Surveyor.

Sir,—It was with immense pleasure and a keener interest that I read in a recent issue of your journal the comments and propositions made by "Lux" regarding the question of surveyors' salaries.

I would be most anxious to add my name to any organised union set up by the combination of the Institutions of Municipal and County Engineers and Municipal Engineers for the purpose of having some control over the "stipends" offered by some councils when advertising for a fully-qualified engineer and surveyor (especially those that are insultingly low, and of these there are many). Certainly the time was never more opportune. After the war labour certainly will seek a fair remuneration, and if the advice of the Whitley Report is followed (this report having been so well received) they will get it.

Why should surveyors not have a proportionate remuneration and fair play?

Surely there are many municipal bodies who can see through the foolishness of these meagre salaries; and is it not a fact that these salaries can only be the means of drawing the poorest of applicants?

Could not useful guidance be gathered from the Teachers' Union when setting up this control of salaries? I shall look to the formation of a suitable union with eagerness.—Yours, &c.,

Mica.

August 7, 1918.

RECONSTRUCTION AND MAINTENANCE OF ROADS AFTER THE WAR.

To the Editor of The Surveyor.

Sir,—I have read with interest the letter on this subject from Mr. C. F. Gettings, published in your issue of August 2nd.

Being one of the "younger members of the staffs" who joined the Road Construction Army under Brigadier-General H. P. Maybury, C.B., I am not in a position to comment on the answers given to questions (1) and (2) contained in the letter; but in regard to question (3) may I give briefly the views which I believe are held by a large number of road surveyors—not, by the way, all junior members of staffs—who came out to France to assist in subduing the Bosche by "paving the way to victory"?

Before the war it was generally admitted that the French system of classifying and maintaining the main roads of the country as *routes nationale* produced some of the finest and best kept highways in the world. These roads have fully justified the high opinion held of them; but only those who have been behind the line prior to a "stunt" can appreciate what roads have to carry under intensive lorry traffic.

This is the class of traffic which the main arterial roads in England will be expected to carry after the war if, as indeed seems probable, much of the transport of goods is borne upon our highways by mechanically-propelled vehicles.

There is little doubt but that under such conditions road construction and maintenance must be controlled and financed on a national basis, and who so capable of exercising such control as the men out here daily gaining the experience fitting them for it?

We shall all be glad to resume civil occupations as quickly as circumstances will permit; but whether those members of the profession who return safely when peace is declared will be content quietly to take up subordinate positions as "younger members of the staffs" after carrying out duties of great responsibility during the war remains to be seen.—Yours, &c.,

Experientia Docet.

In the Field.
August 5, 1918.

To the Editor of The Surveyor.

Sir.—You are doubtless well aware that our old friend The Surveyor finds its way to road makers at the Front, and discussion of the articles contained therein pass dreary hours away. In your issue of the 26th ult. the paper "Road Reconstruction after the War," by Mr. Rees Jeffreys, is particularly interesting, and has been read and inwardly digested for future use by more than one of "the Road Army" now in France and Belgium. It is grateful indeed to find recognition of the work which has been done under General Maybury, and one would hardly expect to have read such a letter which appeared from the pen of Mr. Gettings, the county surveyor of Worcester, in your issue of August 2nd. To use the expression of one of my subalterns in the mess to-day, "Old Gettings has got the wind up!"

In his best approved lofty style Mr. Gettings harps upon "the most trying conditions" under which he and other surveyors have had to work. It appears from weekly perusal of your "Personal" column that the trying part seems to be the extra appointments the surveyors at home are obtaining, such as fuel overseers, food controllers, and, not the least remunerative—viz., the special jobs for the Road Board and War Office. There are a good few surveyors on roads in France who were over military age when they offered the country their services, and the old men are sticking it well and do mean to stick to their most popular General until we have seen "the great adventure" through. But they are impatient when such as Mr. Gettings commence writing. Let such keep quiet and nothing will be said, though it is an open secret over here that more than one of these workers under "trying English conditions" would have tried it in France under the protection of a "Crown" upon their tunics.

Trying conditions—what does Mr. Gettings know about them? Let him come out here, live in a devastated district, work as we did last summer four months on end without an hour off, then Mr. Gettings could talk.

All out here appreciate what people are doing at home; but for heaven's sake, Mr. Editor, do veto their letter-writing about it!—Yours, &c.,

A Captain of 44.

France.
August 10, 1918.

PROJECTING SHOP-WINDOW BLINDS IN STREETS.

To the Editor of The Surveyor.

Sir,—For some time past the Roads Improvement Association has been collecting information as to the regulations or by-laws in force by local authorities in respect to the height of shop-window blinds over footways and the extent to which they may project over the latter.

The results so far show that the dimensions allowed for these vary to some extent, and in some cases no regulations appear to be in force in regard thereto. A clause in sec. 28 of the Towns Police Clauses Act, 1847, provides that—

> "Every person who places or leaves any furniture, goods, wares, or merchandise, or any cask, tub, basket, pail or bucket, or places or uses any standing-place, stool, bench, stall, or showboard on any footway, or who places or leaves any blind, shade, covering, awning, or other projection over or along any such footway, unless such blind, shade, covering, awning, or other projection is 8 ft. in height at least in every part thereof from the ground";

but it will be noticed that the width of projection from the building line, or the distance from the outer edge of the kerb of the footway is not mentioned.

It would therefore be of great assistance to this association if surveyors to local authorities could forward me particulars of the regulations in force in their districts, more particularly as to the distance which the blind or other projection may be fixed from the kerb.

So many accidents have occurred through blinds, &c., projecting too far in many towns where the road traffic is considerable, that local authorities and road users should take joint action to prevent them in the future, and it is with a view to ascertaining all the facts bearing on the question that this association is now making inquiry into them.

Excessive camber on the roads has contributed no doubt to many of these accidents, as in such instances the tendency has been for the vehicle when passing near the kerb or drawing up to load or unload to be tilted at a considerable angle and thus brought into contact with the projection over the footway.—Yours, &c.,

James D. Haworth,
Acting Secretary, Roads Improvement Association.
15 Dartmouth-street, Westminster, S.W. 1.
August 10, 1918.

The Concrete Age.—In his review of the national shipbuilding position in the House of Commons, Sir Eric Geddes paid a well-deserved tribute to the concrete system which has solved the building difficulty in countless undertakings for the Government since the beginning of the war. "On the Wye," he said, in dealing with the national shipyards, "we are building houses of an admirable, but most economical, type. I am assured by the engineer-in-charge that the system of concrete blocks employed is actually cheaper to-day than woodwork or corrugated iron huts." Concrete blocks and slabs, indeed, with our rapidly diminishing supplies of timber, bricks and other materials, are coming to the front by leaps and bounds in every branch of structural war work, and must, of necessity, play a leading part in all schemes of reconstruction, both at home and abroad. It is interesting to learn that the work referred to by Sir Eric Geddes is being carried out on the "Winget" system, the blocks and slabs of which are now being used for 80 to 90 per cent of the present camps, hangars, and housing schemes, &c., as specified by the Admiralty, War Office, and other Government Departments of Great Britain and her Allies.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is not the title "engineer" often used in a very loose manner? Why is it that the words "machinist," "mechanician," and "mechanic" are so seldom employed to designate properly the position of a man? Is not a plumber often described as a sanitary engineer, and an engine driver as an engineer? Is it not also the case that in many trades connected with gas, water and electricity a man designated as an engineer has had nothing to do with engines in the whole of his career? Cannot something be done to stop the improper use of this word?

* * * *

Would it not be interesting if some statistics could be prepared showing the percentage of accidents that used to occur to drivers of horses and those that occur to drivers of self-propelled vehicles? Is it not evident that the driver of a wayward animal runs more risks of accident than the driver of an easily controlled machine, which is absolutely under the will of the driver and answers to his own movements, instead of jibbing, kicking, rearing, shying, stumbling or running away? Are we not also beginning to think that the employment of an animal to draw heavy loads is something akin to cruelty?

* * * *

Was it not a very impressive argument for the improvement of roads adopted by an American engineer some twenty years ago, when he stated that, from exhaustive trials he had made, it was found that "on sandy roads 30 bushels of grain are a load for two horses; on so-called pike roads, 50 bushels was the maximum load; on macadam roads, 100 bushels, and on the best grades of Telford roads, 200 bushels can be carried"? If this experiment could be carried out now how many bushels of grain could two horses draw on the smooth surface of a properly constructed bituminous roadway?

* * * *

Does the Corps of the Royal Engineers ever get much praise for the work they execute, and is it not refreshing to find that their work of laying on a supply of water to Jerusalem in the short period of two months has been pronounced an undoubted success? One is prompted to ask how many of those concerned in the work were civil engineers engaged in private practice before the war broke out?

* * * *

Would it not be rather interesting to know how many additional refuges, either permanent or temporary, have been placed in the streets of the Metropolis since the advent of fast-moving motor traffic? Whatever this number may have been, is it not evident that still more are required in order to give pedestrians a chance to cross most of our streets with safety? Has it not been found by experience that the provision of these refuges not only diminishes the number of accidents, but is really helpful to the vehicular traffic?

* * * *

Is it not satisfactory to find, from the answer given by Earl Stanhope to Lord Montagu of Beaulieu in the Upper House the other day, that there is no intention on the part of the Government to hand over the control of our roads to the military authorities? But what was the meaning of his statement "that he hoped eventually the control would go back to the local authority"? For has such control been lost? And is it not also to be hoped that the "Joint Roads Committee" he foreshadowed will be one that has some knowledge of road making and maintenance, and all the complicated conditions which surround such technical matters?

* * * *

Was not the paper on "The Growth of London," presented by Mr. W. R. Davidge at the annual meeting of the Institution of Municipal and County Engineers of exceptional interest as being a wonderful condensed history of the evolution of the streets of the mighty Metropolis? Is it possible for Mr. Davidge to print his paper in pamphlet form, so that a permanent record can be kept of this interesting description of London? Is it not evident from the paper that nearly all the great street improvements were carried out during the nineteenth century, and that some of the principal streets are really younger than they look?

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

INSPECTOR OF NUISANCES.—August 19th.—Halesowen Rural District Council. £170 a year.—Mr. E. H. Grove, clerk, Church Steps House, Halesowen.

ENGINEERING ASSISTANT.—August 19th.—Bedford Town Council.—Mr. A. Greenshields, borough engineer and surveyor, Town Hall, Bedford.

INSPECTOR OF NUISANCES.—August 23rd.—Easingwold Rural District Council.—Mr. F. J. H. Robinson, clerk, Council Offices, Easingwold, Yorks.

SURVEYOR AND INSPECTOR OF NUISANCES.—August 24th.—Wilton Town Council. £120 a year with £20 war bonus.—Mr. Henry J. King, town clerk, Municipal Offices, Wilton, Wilts

ASSISTANT SURVEYOR.—August 29th.—Adwick-le-Street Urban District Council.—Mr. G. Gledhill, engineer and surveyor, Council Offices, Adwick-le-Street, Doncaster.

ARCHITECT AND SURVEYOR.—August 30th.—Gellygaer Urban District Council.—Mr. Frank T. James, clerk, Council Offices, Hengoed, Glam.

SURVEYOR.—August 31st.—Ludgvan Urban District Council.—Mr. J. J. Hill, clerk, 12 North-parade, Penzance.

ASSISTANT COUNTY SURVEYOR.—September 9th.—Kilkenny County Council. £120 a year.—Mr. Thomas Drew, secretary, Court House, Kilkenny.

COUNTY SURVEYOR'S ASSISTANT.—Somerset County Council.—Mr. Gordon R. Folland, acting county surveyor, Wells, Somerset.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

WIGAN.—August 19th.—For the extension of the electricity works.—Mr. R. B. Donald, borough engineer and surveyor, Municipal Offices, King-street West, Wigan.

GLOUCESTER.—September 9th.—For the erection of a pavilion of twelve additional beds at the tuberculosis block of the Oban hospital.—City Surveyor, Guildhall, Gloucester.

Engineering: Iron and Steel.

BELFAST.—August 16th.—Supply of electricity plant.—Mr. T. W. Bloxam, city electrical engineer, Belfast.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories, &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

BURLEY AND MENSTON.—The Joint Sewerage Board are offering for sale two complete suction-gas producers.—Mr. Harry Riding, engineer and surveyor, Council Offices, Menston, near Leeds.

CAERPHILLY.—The urban council offer for sale a Merryweather's improved sliding carriage telescopic fire escape.—Mr. T. H. Richards, Council Offices, Caerphilly.

Sanitary.

BLACKWELL.—For the construction of works of surface drainage and storm overflow.—Mr. H. Silcock, surveyor, Rural Council Offices, 67 Westgate, Mansfield.

OFFICIAL NOTICE.

DIRECTIONS OF THE ROAD STONE CONTROL COMMITTEE.

Dated the 17th day of July, 1918, for the purpose of Controlling the Output, Supply and Transportation of Road Materials, issued under Section Four of the Road Stone Transport Order, 1917.

CLAUSE H—PRICES.

1. On and after the 15th day of August, 1918, no person shall, without the previous sanction in writing of the Control Committee, sell, deal with or otherwise dispose of road materials at a price exceeding the authorised maximum set out on the Official Forms M.56 for untarred material and M.56A for tarred material.

2. On and after the 15th day of August, 1918, the addition to the price of road material free on rail to cover delivery at destination station in privately owned wagons shall not exceed the sum which would be charged by a Railway Company for such conveyance if the material were transported in railway owned wagons.

(By order)

P. J. BLACK,
Secretary.

Road Stone Control Committee,
29 Cromwell-road, S.W. 7.
July 17, 1918. (3,845)

The Surveyor

And Municipal and County Engineer.

Vol. LIV. AUGUST 23, 1918. No. 1,388.

Minutes of Proceedings.

Extraordinary Traffic Again.

The case of *Weston-super-Mare Urban District Council* v. *Henry Butt & Co., Ltd.*, which was recently decided by Mr. Justice Eve, raised some points of peculiar interest in the law relating to extraordinary traffic. According to the report of the case which appeared in the *Times*, the defendants are quarry owners working a limestone quarry and kilns near Weston. Of late years the principal part of their business has been the burning of lime, which was dispatched by rail, being carried to the station along Bristol-road, Arundel-road and Albert Quadrant. Down to August, 1913, they used for this purpose horse-drawn vehicles having a maximum weight of about 3 tons, but in that month they began to use a steam wagon and trailer, a second being added in January, 1916. On these facts two questions arose: (1) Did the defendants impose extraordinary traffic on these roads when they first adopted steam traction? and (2) If so, had that traffic ceased to be extraordinary and so far become ordinary traffic in the early part of 1916 as to impose on the plaintiffs the obligation of providing roads adequate to carry it? The learned judge answered both these questions in the affirmative, holding that the test to apply in a case like the present, when the frequent passage of concentrated weight was the element relied on as making the traffic extraordinary, was to ascertain whether at the time of the introduction of the means of transporting that concentrated weight there was any existing traffic imposing a burden on the road comparable with it in quantity or frequency. If there was it might well be that the new departure, although it increased the burden on the road, did not alter it, and was therefore only in the nature of increased ordinary traffic. If, on the other hand, there was not any such pre-existing traffic, then the innovation was not ordinary but extraordinary traffic on the road. As regards the measure of damages, the learned judge said that *primâ facie* this was the difference between the sum expended in repairing the particular highway during the year and the average sum expended on it in previous years. But obviously that could only be the *primâ facie* method for ascertaining the damages, as there might have co-existed with the extraordinary traffic for which the action was brought the traffic and causes contributing to the necessity for increased expenditure, and the Legislature could not be presumed to have intended to impose on the person responsible for the extraordinary traffic any liability for increased expenses due to other causes. Bearing those principles in mind, his lordship considered the plaintiffs' claim for each of the roads, and awarded sums considerably less than those claimed.

* * * *

Dublin's Housing Requirements.

The summary of Mr. P. C. Cowan's estimate of the Dublin housing requirements, which has been published, shows that the estimated cost of meeting the deficiency of house accommodation in the city is £8,640,000. There are, it appears, no fewer than 16,500 new houses required, and the total cost of these alone at £400 each is £6,600,000. These are colossal figures, and while there is no need to question the accuracy of the estimate there will be some natural curiosity to know how and why such a state of things has arisen. Such a crisis in the affairs of a city would seem to imply one of two things: either private enterprise from some reason or other has failed to meet the public necessities, or the public authority has been remiss in the discharge of a duty imposed by its paternal and legal position. Mr. Cowan would appear to lend some countenance to the latter theory, for in the course of his report he does not hesitate to indulge in what some people might regard as, to say the least, controversial language with respect to the municipality of Dublin. While exonerating this body from corruption or jobbery, he remarks that like other corporations it has had to contend with great difficulties of very long standing. "A system of government," he proceeds to say, "which entrusts the management of a great city and the handling of more than a million pounds a year to the nominees of a multitude of needy people who have a direct interest in lavish and unproductive expenditure and, so far as their limited views extend, no personal interest in efficiency or economy, and which disfranchises all who are steadied by the responsibilities and duties of property or a great business concern, cannot secure good results." It appears then that, while private enterprise has been repelled, the nominees to whom Mr. Cowan alludes have been too busy casting their net in one direction to pay attention to what was after all a matter of deep self-interest to themselves and those whom they represented—the proper housing of the citizens. There is, of course, no remedy for this except a systematic propagandist course of information and education, and it would seem to us that an alert Irish intelligence ought to bring this to bear upon the problem without delay.

* * * *

By-Law Reform.

Prolonged discussion of the question of the reform of existing codes of building by-laws has not as yet led to complete agreement as to the exact lines upon which this reform should take place. This fact was clearly demonstrated in the course of the discussion at the recent Oxted meeting of the Institution of Municipal Engineers on Mr. Barralet's paper, when diverse opinions were expressed on several of the suggestions made. As regards the form in which by-laws are cast, certain speakers were of opinion that the phraseology is too legal and not sufficiently practical. We quite agree that it is an essential characteristic of a good by-law that its meaning should be plain to the ordinary individual; but it must be remembered on the other hand that unless framed in the most precise language an otherwise excellent by-law may be held to be bad for uncertainty. On the whole, we are inclined to agree with Mr. Barralet that, although legal terminology is necessary, tiresome reiteration of the same phrases might in some cases be avoided without any harm being done. The principal reforms suggested by Mr. Barralet touching the subject matter of the model code included greater elasticity as regards the width of new streets, the full recognition of materials other than brick and stone for walls, the finishing of party walls at the roof level, and the abolition of the intercepting trap, &c. Finally, he spoke of the spirit in which the by-laws should be administered so as to obtain the best results, and referred to the recent Repton school case, which has already been discussed at length in these columns. It is, of course, well known that a local authority has no power to suspend the operation of any by-law in individual cases; but "there are occasions when the end in view is best accomplished by a not too literal interpretation."

* * * *

Welsh Agriculture.

The problems of Wales in regard to the development of agriculture are not very different from those which arise in this country. There has been the same gradual diminution for many years past in the area of arable land with a corresponding increase in lands under permanent pasture. These conditions, coupled with a large increase in the normal population, have naturally led to very extensive and rapidly growing imports of foodstuffs. The position is well summed up in a single sentence in Mr. Evan Davies' article on "Agriculture in Wales" in the Welsh Housing Year-book for 1918, where he

says that before the war Wales was spending approximately twelve millions annually on imported food supplies, whereas if the area under cultivation in 1871 had been maintained, and its productivity increased, the country would have been almost self-supporting. All this means that in the immediate future the efforts of Wales in the direction of increased food production must be at least as strenuous as those demanded of other parts of Great Britain; and among the problems thus raised not the least important is that of rural housing. In this connection, however, the local conditions obtaining in the Principality must not be overlooked, and it is fortunate that there is in existence such a body as the Welsh Housing and Development Association to watch the trend of events. That body is advocating in the first place an adequate wage for the agricultural labourer, and in the second place compulsory building by local authorities, this duty to be enforced, in case of default, by the county councils, or in the last resort by the Board of Agriculture. Whatever may be the merits of this policy, it at least affords a basis for discussion of a question that is at once difficult and urgent.

ROADS IN WAR-TIME AND THE AFTERMATH.

DISCUSSION AT MUNICIPAL ENGINEERS' MEETING.

The paper entitled "Roads in War-Time and the Aftermath," by Mr. G. E. Crowter, highway surveyor to the Godstone Rural District Council, which appeared in our issue of last week, was discussed by a number of those present at the meeting of the Institution of Municipal and County Engineers at Oxted at which it was submitted.

On the proposition of Captain John N. Prior (Sevenoaks), seconded by Mr. John Taylor (Uckfield), a hearty vote of thanks was passed to Mr. Crowter for his paper.

Mr. A. G. Tucker (Mayfield) remarked that the subject was a very big problem, upon which Mr. Crowter had given them an excellent paper. He did not quite agree with Mr. Crowter in giving everything over to the Road Board. His experience had not always been a success with the Road Board. It seemed to him that there would have to be a big authority to take charge of the roads after the war if they had got to put them in a thorough state of repair as before.

Mr. S. R. Drake (Leatherhead) said he was extremely interested in this very common-sense paper. In his district, to a certain extent, they had selected the main roads, district roads, and county roads, and they were divided up in the manner practically as Mr. Crowter advocated. The main roads were those that went to the big towns in and out of the county, and were linked to the district council roads and the county council roads and other roads, and were paid for out of the local rates.

Mr. T. C. Barralet (Godstone) said the paper struck him as being admirable because it projected itself into the future. That was what they were bound to do in times like this. It appeared that what Mr. Crowter meant was that what they now called main roads, controlled by various county and other authorities—like the road from London to York—should be under one authority, which should be responsible for the whole lot. His (the speaker's) experience as a cyclist showed that that was the right and proper solution of the main road difficulties. He remembered having a ride some years ago down to Worthing. He could not help noticing that the road down to Horsham was in excellent condition, but when he got below Horsham how sadly it deteriorated. There was no reason why a main road should be worse in one part than another. Under one national authority it should be kept good, instead of being, like the curate's egg, "excellent in parts." Mr. Crowter had pointed out that the main roads of the future had got to carry much greater traffic than they were constructed for in the first place. They had to bear mechanically-drawn vehicles vastly more heavy than the old wagon and the old farm wagon. That undoubtedly must be recognised. The old system tried to fit the traffic to the road. In the future they had got to fit the road to the traffic. That was undoubtedly the common-sense view to take of things. In France for many years they had had in force a national road system, and anyone who had been over the road from Havre to Rouen—long before it had been knocked about by the war—as he did some thirty years ago, could not help contrasting this fine State road with what they saw in this country. He knew that since that time English road-making had made vast strides, but that road bore indications of some intelligent management. It was excellent all along, and not good only in parts. Instead of having roads under so many different authorities, overlapping each other, they should be under one body. The roads of the country were the great arteries of the country, and it was necessary that there should be no restrictive parts of the arteries. He was satisfied that from papers of this description would evolve in England what they hoped to see in the future.

Captain John N. Prior said he believed after the war the Road Board would introduce some most drastic alterations with regard to the roads of England, something on the lines Mr. Barralet had suggested. He believed that certain regulations would be adopted with regard to mileage, particularly with regard to State roads. He believed it could be safely said that State roads would be controlled by Imperial taxation. It was certainly wrong to inflict all this expense upon the counties because they happened to be situated in the way of main roads.

The Chairman said one of the important points that Mr. Crowter mentioned was the question of who was to pay. Was the money collected to be spent on the roads? Hitherto there had been the petrol tax on vehicles, but he was afraid that very little of that money had gone to the payment of the roads, as it should have done. It seemed to him that they wanted not to go backwards, but to bear in mind the original system of tolls, and what advantage they would get from a system, and how to collect these tolls in such a way that it would make it commercially possible to do it. It must be done in a fair and equitable manner, but it could scarcely be done in the same way as tramways and railways, which had to pay on a heavy assessment in each district. Clearly, if vehicles were going to be used on the roads in the way that tramways and railways used the roads, then the owners of the vehicles should support the maintenance of the roads. He could agree with Captain Prior with regard to the excellent work likely to be done by the Road Board in the future. It was composed of most practical men who took a general view of things, and was not comprised of the usual type of State officials. The difficulty in this country was that they had drifted into a system of having everything done for them without helping themselves. He thought they could rest assured that the Road Board would not adapt itself to conservative views. The paper of Mr. Crowter marked a very important step in the progress of this institution. He thought it was one of the first papers presented to any municipal institution, and it should set members thinking on the importance of the institution in the future in connection with roads. Personally, he would like to see the paper read at all the district meetings of the institution throughout the country, so that it should be discussed not only in the Southern District, but in all districts.

NEW SUBSTANCE FOR FIGHTING FIRE.

(Communicated.)

It has been known for some years that the most practical method of extinguishing fierce conflagrations of petroleum or other highly inflammable substances is smothering with carbonic acid gas. The difficulty, however, has been to find a suitable vehicle which will carry the gas without loss on to the burning surface. Various foam-producing substances, such as glue and glucose solutions, soap, &c., have been tried for this purpose, but none of these has proved strong enough to hold the gas until it has smothered the fire.

German chemists came very near to finding a suitable envelope, but it falls to the crédit of an English chemist, who, from a certain root extract, has produced a heavy viscous fluid giving the strongest and toughest foam so far known. This fluid has been named by the manufacturers "Foamite." It was instantly recognised by all the leading oil well and refinery concerns in America as the "last word" in fire fighting, and the "Foamite" system has been quickly adopted by them. The United States Government has also found its use indispensable in the Navy.

Remarkable results have been obtained on oil and petrol fires where the "Foamite" system is installed, and many thousands of pounds' worth of stock and property have been saved. Some of the insurance companies in America are already reducing their rates to those who establish "Foamite" in their works. The "Foamite" solution holding carbonic acid gas is pumped on to the fire, and immediately lays a durable blanket of tough bubbles over the fire surface, so that within a comparatively few minutes the fiercest blaze is put out.

This system is now being extended to small hand extinguishers for use in works and factories in the simplest manner. "Foamite" does not give off any poisonous fumes, which are such a drawback to the ordinary chemical extinguishers.

It is gratifying to know that English capital is largely interested in the company formed in America to work this business, and negotiations are now proceeding for the formation of a company in England. Meantime all inquiries should be addressed to MacAndrews & Forbes, Limited, 2 Broad Street-place, London, E.C. 2.

Northern Road Material Agents and Merchants.—At a further meeting held at the Griffen Hotel, Leeds, on Tuesday, August 13th, it was unanimously decided, in view of the splendid response of those interested in the movement, to form an association of road material agents and merchants in the North of England. The first full meeting will be held at the Griffen Hotel, Leeds, on September 24th, at 3.15, and a cordial invitation is extended to any agent or merchant in the North to attend, previously signifying their intention to the hon. secs., Messrs. Newsome and Peel, Burley-in-Wharfedale.

Building By-Laws.

INSTITUTION OF MUNICIPAL ENGINEERS DISCUSSION.

At the recent meeting of the Institution of Municipal Engineers, held at Oxted, a paper by Mr. T. C. Barralet, surveyor to the rural district council, entitled "My Evidence at the Departmental Committee on Building By-laws," was discussed by the members.

Dealing first with the question of the universal application of building by-laws throughout the country, Mr. Barralet remarked that there were still a great many districts in which by-laws did not exist, and that there was nothing to prevent a perpetuation of the "build as you please" policy which had wrought such evil in the past. He contended that the actual site of a building, rather than its situation in a particular district, should determine the code of regulations under which it should be erected. This would obviate the frequently encountered anomaly of a thickly populated district being under a more stringent code than one more congested, and one side of a street which happened to be a boundary line being subjected to drastic by-laws, and the other to the easy rural code, or none at all.

NEW STREETS.

Mr. Barralet advocated a greater amount of freedom than now existed with regard to width of lay-out of new streets, provided there was adequate space between the houses and that sufficient land was dedicated by the owners for future widenings when found necessary. In rural districts many main roads carrying heavy traffic were barely 8 yds. wide; yet any new streets that were made to communicate with them must be at least 36 ft., though the traffic was limited to a few tradesmen's carts and perambulators. The cost of this was a grave detriment on owners who desired to develop building land, and the dull uniformity enforced had made the suburbs of large towns hideous. There was no power in the building by-laws to compel the making up of new streets; but some were allowed to become mere quagmires, and provision should be made that a footway at least should be constructed and maintained by the owners. Sec. 19 of the Public Health (Amendment) Act, 1907, would go some way in this direction, but the Local Government Board had hitherto refused to apply the section to rural districts.

CONSTRUCTION OF WALLS.

The by-laws now in use are mainly founded on the code drawn up in 1877. At that time brick and stone were practically the only materials known; even concrete was in an experimental state. Hence the 9-in. brick has become the minimum standard. The advent of steel framing, reinforcements, concrete slabs and other weather-proof material has brought about other conditions which ought to be recognised in the by-laws. For buildings of a limited size, a proper foundation, with plenty of air space around them, there appears no reason to restrict their external walls to any material or any thickness provided it affords sufficient bearing for the floors and roofs, and is weatherproof.

CROSS WALLS.

These under present regulations must be not less than 9 in. in thickness. Sufficient abutment is provided by 4½-in. walls, if placed not less than 12 ft. apart. It is recommended that the cottage of the future should be wide and narrow without outbuildings—the 30-ft. limit for 9-in. external walls might in some cases preclude such planning.

PARTY WALLS.

In many cases regulations are so framed as to require party walls on account of their greater height to be of greater thickness than external walls. This I regard as unnecessarily burdensome, as also the obligatory carrying up of party walls above roofs, which often leads to unsound construction and architectural disfigurement. A party wall carried up to the underside of a roof is equally efficacious as a preventive of the spread of fire, and the saving in brick-work and coping is not to be despised.

These projecting party walls also tend in many cases to complicate unnecessarily the collection of rain water.

ROOF COVERINGS.

In nearly all by-laws that exist it is stipulated that the materials for covering roofs must be of an incombustible material, which practically limits the choice of a builder to tiles, slates or concrete slabs for the main roof, and lead, zinc, or other metal for flats and dormers. Thatch is prohibited, and, though it is picturesque, I am afraid it must be regarded as insanitary, and I am not prepared to advocate its revival. But of recent years there have come on the market materials which appear to be well adapted for the lighter forms of construction. These, being inflammable in the sense that they will burn if fire is applied to their edges, are generally prohibited as roof coverings except in the case of detached sheds. It seems reasonable that their use should be allowed for all outbuildings and in the case of dormers, flats, and gutters, in view of the prohibitive cost of metallic coverings.

It is, of course, proper that building regulations should take some cognisance of the liability of a building to danger from fire; but there is some inconsistency in requiring a non-inflammable roof, while so many other parts of the building far more liable to contact with fire are of wood. Again, once a fire has reached a roof, the cracking or dropping of slates or tiles are far more conducive to its spread than the slow smouldering of a continuous roofing materials such as that described. For these reasons I feel justified in recommending that the words "fire-resisting" should be submitted for "non-inflammable" in this connection.

DRAINAGE.

Being a convert to the undesirability of the intercepting trap with its concomitant of fresh-air inlet, I advocated the desirability of its abolition in future sewer connections rather than making it permissive. In the latter case it would tend to the unequal distribution of sewer ventilation, whereas the total absence of interceptors ensures free egress at each connection.

An exception was made in the case of cesspool drainage, when the advantages of an intercepting trap are manifest.

WASTE PIPES.

In few districts no other system of disconnection is permissible than that of a waste pipe being discharged over a channel 18 in. in length. Where the channel is of a glazed material, there is little exception to be taken to it; but in the cheaper forms of construction it is generally of brick thinly coated with cement which rapidly wears away leaving an irregular and slimy surface. Moreover, one frequently sees the projecting part of the waste pipe broken off the surface of the wall, so that the discharged liquid trickles down it and causes dampness. The back inlet or side inlet is far more sightly and equally sanitary, as the contents of the small gully are so frequently changed as to obviate any risk of putrefaction. There appears to be no valid reason why these appliances should be prohibited.

CONCRETE UNDER DRAINS.

Much diversity of opinion still exists as to this being made obligatory in all cases. With soft or clay subsoils there can be no question about it. As a counsel of perfection it is probably best that all the drains should be laid in concrete, and in many districts there is no option in the matter. I have not infrequently seen good rock removed to make room for inferior concrete. It may also be noted that the same precautions are not always taken in regard to sewers laid by the authorities themselves. This seems a matter that may with propriety be left to the judgment of the surveyor—even if it lays him open to the charge of favouritism.

SIMPLIFICATION.

It will be generally admitted that there has been a tendency of recent years for building regulations to become cumbrous and unwieldy, the sense often being lost in an ocean of verbiage and repetition. To the lay mind it would appear there ought to be a much shorter way in many instances of arriving at the desired point. Of course legal terminology is necessary, but the tiresome reiteration of the same phrases could surely be reduced without serious detriment.

As an instance of lightening the load, I suggested the elimination of the clauses that are usually incorporated, bearing on the closure of houses erected under the by-laws that are unfit for habitation. These, it will be remembered, confer powers on the local authority almost identical with the procedure in the Housing and Town Planning Act, 1909, and have therefore become unnecessary and obsolete.

Another and last point was the meticulous particulars required from persons submitting plans of new streets. These unfortunate persons not only have to submit their plans and sections, but among other things the intended name of a street, the size and number of the intended building lots, and the intended class and nature of the building to be erected thereon, and the intended height of walls and fences. All of these things are entirely outside the purview of a local authority; they cannot be insisted on and might well be dispensed with.

I hold the view that quite as important as the verbal accuracy of by-laws is the spirit in which they are administered. No conceivable code can meet every individual case of difficulty, and it is here where the tact and knowledge of municipal engineers are most required. The object of all regulations should be to secure definite recognised ends, and there are occasions when those ends are best accomplished by a not too literal interpretation. I have known much useful work abandoned through the pedantic insistence on immaterial

points of law. The familiar recent case of Repton School, which resulted in one of the by-laws made under the Local Government Act, 1907, being pronounced invalid by the High Court is a case in point. It may have been literally correct that the addition of a bay window made an old building into a new one with all the consequences which followed.

It is incidents of this kind that tend to bring building regulations into discredit by creating an impression on the public that their object is to harass and impede rather than to assist and regulate legitimate enterprise.

I am not pleading here for any undue laxity either in the framing or administration of by-laws; they have proved of the utmost benefit to the *bonâ-fide* builder by relieving him from the unfair competition of the hedge carpenter and the jerry speculator, to whom all regulations are anathema; they have undoubtedly raised the standard of building construction from its sorry condition of half a century ago, and have to a large extent prevented the perpetuation of the fœtid slums which sprang up in all our great cities about the middle of the last century. They have probably done more than anything else in lowering the death rate and raising a healthier population.

On the proposition of Captain John N. Prior (Sevenoaks), seconded by Mr. John Taylor (Uckfield), a hearty vote of thanks was passed to Mr. Barralet for his paper.

Mr. A. E. Stickland (Windsor), who opened the discussion, said it was a very big question. It was a case of discussing a paper in which the opinions of a gentleman had been given in evidence, and not of discussing the opinions before he gave them to the committee. Otherwise they might have been enabled to enlighten him or to have helped him in some little way. The opinions he now gave were, as he said, of what he had done. The question of building by-laws was indeed a very tricky one. In giving his opinion he (the speaker) did not altogether agree that the Local Government Board should be the people to have the right of controlling the making of by-laws. For many years past the Government were practically the controllers of all affairs in the country, but now they had put them under the different counties. He thought it would be very much better if the question of building by-laws, instead of being worked from the Local Government offices, should be worked through the county authority and districts. On the county councils they had people representing every district practically in the whole of the county. Under the present system they had a number of lawyers in London who had to get up a scheme of by-laws, and, whatever way they looked at it, they considered how they were going to bring money to their pockets or their friends' in the future. Such by-laws were purely got together by people in the legal frame of mind, and were not got together by practical builders and those people who had had experience in the work. Instead of being in the hands of the Local Government Board, they should be in the hands of the county council, so that if a district was a purely commercial one they should be able to go to the council and say they wanted a reasonable series of by-laws. There should be a number of different by-laws applicable to different sections, and these should be enforced in the district to which they were applicable. What was the use of saying that by-laws applicable to Lancashire should be applicable to Cornwall? Was there any reason why the Welsh and Northumberland miners should be put under the same by-laws as in the rural districts of Surrey and Kent? Was there any reason why they should work together? What suited one district did not suit another. They talked about by-laws in the North of England to have a bath in cottages. Well, if they wanted baths, then they should not be provided for by by-laws, but they should be public baths, and not take up the space in a man's house that was very small. These people did not wish for it. Those who had lived in the North of England knew that the miner did not wash in his home; his wife washed him outside the door in the street. Nine out of every ten of the pitmen in Northumberland and Durham in the small colliery districts were washed outside their front doors. There was no shame amongst the men and women because it was a custom that had been long in vogue.

Captain John N. Prior (Sevenoaks) said he did not agree in many respects with the last speaker. He could not see how they were going to improve matters by giving permission to several bodies to draw up and form by-laws. He contended that the Local Government Board should be the head in the matter, but certainly with the concurrence and advice of the district councils. The by-laws should certainly emanate from one head.

Mr. John Taylor (Uckfield) said the paper really contained a good deal of matter that might conduce to long discussion. Mr. Barralet talked about being a little inclined to heresy, but he was not the only one. As to Mr. Stickland's remarks about county councils having the power to frame by-laws to suit the different localities, he did not think that would be better managed by county councils than it was at the present moment by the Local Government Board, because there were details and different kinds of by-laws in existence now which were framed by the Local Government Board, and they embraced nearly all the conditions that were existing, whether in Cornwall, Kent, or Surrey, or elsewhere. Some by-laws were most restrictive, and other by-laws, which might be adopted by a rural council for instance, were almost without any restrictions at all, except so far as drainage was concerned. The question of drainage and the condition of drainage was almost alike in a manufacturing district or rural district. There was one question, perhaps, upon which he was a little heretical, and that was the question of intercepting traps. He had seen a good many intercepting traps put in and he had seen where they had been a terrible nuisance. The intercepting trap was a bigger nuisance than a ventilating pipe against the side of a house, because when the flap of the trap outlet got out of order and was against the cottage gate, then they got the smell from the drain itself. If the intercepting trap was left out, and every house drain had a ventilating pipe from the sewers, he did not see that there could be any great nuisance. Then with regard to the question of emptying into cesspools, he did not see any difference between the smell from a cesspool and the smell from a foul sewer. The smell of the cesspool was no worse. In fact if a drain was sound and the connections were sound, as they should be, then the ventilating pipe should take off the nuisance if there was a drain to the cesspool from the house.

The Chairman said, in summing up the situation, he would like to remind them that they were all living in difficult times. After the war things would be altered very much, and they would all agree that there was one thing they wanted to aim at, and that was to get lawyers to talk plain English instead of adopting the jargon which was now so much the fashion. He thought surveyors might assist in framing by-laws, and endeavour to assist in interpreting the lawyer jargon into plain English. They wanted simple by-laws that could be generally accepted universally, with special by-laws added thereto to deal with special districts, in accordance with the peculiar nature of the district. It rather looked as if by-laws had got too cumbersome for the Local Government Board to deal with. It would be better to have by-laws with reduced requirements and leave it to particular districts to add any special by-laws if necessary.

THE TRIBUNALS.

WOMEN AND ENGINEERING WORK.

At the West Sussex Appeal Tribunal held at Worthing consideration was given to the case of the Worthing building inspector and general assistant to the borough surveyor, thirty-eight, married, Grade 2. "I submit," said the National Military Representative, "there should be some kind of finality now. He has been exempted for two and a-half years and I think the time has come when this man should serve," he added. Mr. F. Roberts, borough surveyor, appeared and stated there were seven assistants in the office before the war, and applicant was the only pre-war man left. Mr. Roberts said he must have a man who had local knowledge of the town, sea defences, &c. His work comprised office routine, to answer technical questions, and a considerable amount of outdoor work, surveying, &c. "Any women in the office?" queried Major Grantham. "No," replied the borough surveyor, "it isn't nice; women cannot discuss drains, &c." Major Grantham said women were doing work in engineers' offices in some parts of England, but Mr. Roberts said there were no lady engineers or surveyors. Three months' further exemption was granted.

Mr. Shelley, clerk of the East Preston Rural Council, and Mr. J. T. Strong, chairman, appeared in the case of their surveyor of highways, building and sanitary inspector, thirty-six, married, Class A. A telegram was read from the Air Board stating that applicant was engaged on work of urgent importance, and intimating that he would not be called up by the Director of National Service. Four months' exemption was given.

Fire Brigade Co-operation.—Between seventy and eighty representatives of the fire brigade authorities of the Midlands met last week at Birmingham to consider the constitution of a West Midland fire brigade area on the lines of that recently established in the North-Eastern counties. A draft scheme was approved and a committee was appointed to arrange details and report to the Home Office.

Messrs. John I. Thornycroft & Co.'s New Offices.—Messrs. John I. Thornycroft & Co., Limited, shipbuilders and engineers, have notified us that in consequence of the Government having commandeered their offices at Caxton House, Westminster, they are removing to new offices at 10 Grosvenor-place, London, S.W. 1. The new offices are quite close to Hyde Park Corner station (Piccadilly Tube) and a few minutes' walk from Victoria Station.

Institution of Municipal and County Engineers.

TWO DAYS MEETING AT ABERGAVENNY.

A successful meeting of the Institution of Municipal and County Engineers was held at Abergavenny on Friday and Saturday last, the 16th and 17th inst. There was a good attendance of members both from South Wales and the wider area of the institution. The business meeting was held in the Town Hall, the Mayor (Alderman Z. Wheatley, J.P.) receiving and welcoming the members, and later entertaining them to luncheon at the Angel Hotel. In the afternoon a paper by Mr. Mansfield, the borough surveyor, on the public works of Abergavenny brought out a full discussion.

Mr. T. W. A. Hayward (Battersea) presided, and amongst those present were Messrs. A. Dryland (Surrey), J. Parker (Hereford), F. Wilkinson (Deptford), D. M. Jenkins (Neath), district chairman, H. Alex. Clarke (Briton Ferry), hon. district secretary, E. W. Turner (Birmingham), W. Fiddian (Stourbridge), F. Woodward (Stourbridge), T. Hatcher (Porthcawl), T. E. Harvey (Merthyr Tydvil), W. E. Lowe (Pontypridd), G. S. Morgan (Llantrisant), A. J. Willcox (Abergavenny Rural), D. H. Price (Bedwellty), E. Worrall (Stretford), E. W. Edwards (Mynddislwyn), E. S. Ryder (Bushey), and A. P. I. Cotterell (Westminster).

The Mayor (Alderman Z. Wheatley), in welcoming the institution, said they felt it was a great compliment to Abergavenny to be selected for the meeting. They had in Abergavenny a good sewerage system and an excellent water of great purity. Following an appreciation of the past history of Abergavenny, the Mayor claimed that the town had made good in the present war, having given liberally of men and money to the country's cause. He mentioned that the ex-gas manager served the town for over forty-one years, and was now consulting engineer, the late Mr. Haig was borough surveyor twenty-six years and Mr. Rutherford had forty-six years of service, a total of 113 years by three officials. Their present officials were men of high character and integrity.

The President thanked the Mayor for the cordial welcome he had given to the institution, and remarked that such gatherings were one of the best means of education for the municipal engineers, as their knowledge was constantly widened for the benefit of the local authorities which they served. Their borough engineer (Mr. Mansfield) had a high reputation for his professional ability, and was always anxious to do what he could to help his confrères. He was pleased to hear the Mayor speak in terms of so much appreciation of the officers who had served and were now serving the town of Abergavenny. He was glad to notice that the governing body of the borough were quite alive to modern practice and fully looking after the interests of the district.

The meeting then adjourned, and the members were the guests of the Mayor (Alderman Z. Wheatley, J.P.) at a luncheon at the Angel Hotel. The Mayor was in the chair.

The Chairman proposed the toast of the Institution of Municipal and County Engineers.

The President, in responding, claimed that municipal engineers had done their bit in the efficient carrying out of engineering works to provide an abundant supply of pure water, good drainage, the scientific treatment of sewage and proper housing of the people.

Mr. D. M. Jenkins (Neath), district chairman, who also responded, claimed that the members of the institution had a very high standard and endeavoured to carry out their duties for the general good of the public.

The President (Mr. T. W. A. Hayward) occupied the chair when the meeting was resumed at the Town Hall on Friday afternoon.

The following paper was presented for discussion in the course of the proceedings:—

ABERGAVENNY: ITS MUNICIPAL WORKS AND UNDERTAKINGS.

By Frank Mansfield, Borough Surveyor.

Abergavenny, "The Gate of Wales," has an area of 825 acres, a rateable value of £39,141, and a population (1911) of 8,511. The death-rate for the year ending December 31st, 1916, was 16·6, and the birth-rate 20·4 per 1,000. The total indebtedness of the council at the present time is £61,163; a penny rate produces £130. The average rainfall is 39 inches.

HIGHWAYS.

There are 15 miles of roads reparable by the council, their construction being as follows:—Clee Hill granite macadam, 4 miles; limestone, 6 miles; river gravel, 5 miles.

The last mentioned are light traffic roads.

The paving, with the exception of the main street, which is composed of flagging and concrete in situ, consists of 2 in. of ¾-in. tarred limestone, surfaced with ⅜-in. tarred topping, laid on a bottom of 4 in. ashes, well rolled.

The principal roads of the town are sprayed annually. Previous to 1911 the corporation let this work by contract. In 1911 the corporation purchased one of Week's horse-drawn spraying machines, 230 gallons capacity, for £100, and have since carried out this work departmentally.

In dealing with street widenings and improvements, the council have been keenly alive to effecting improvements where the necessity has arisen.

SCAVENGING, REFUSE COLLECTION AND DISPOSAL.

The scavenging and collection of house refuse is done by the council staff. For the purpose of scavenging the town is divided into four districts. The collection of house refuse is bi-weekly, and is taken to a refuse tip, where the lighter matter is burnt and the remainder levelled and covered with soil.

HIGHWAY DEPOT AND YARD.

This adjoins the cattle market, and consists of stabling for five horses, mess room and stores, with loft over. Roller and smith's shop, and cart and implement shed, shop for the mason, carpenter, and plumber and painter are adjoining. The stone and tar-macadam are situate on the west side of the slaughter houses.

FIRE BRIGADE.

The brigade is a paid brigade, and consists of captain, first and second lieutenants and fourteen men. The equipment consists of a Shand Mason manual fire engine, capable of throwing 200 gallons per minute, two hose carts, with the usual complement of hose, &c., and a Simonis curricle fire escape.

The town is amply supplied with fire hydrants, and the pressure of water in the mains is such that the necessity for the use of the manual engine at a town fire is *nil*, but for country fires—and the brigade serve a very large area—its utility is beyond question.

Shortly after his appointment the author was instructed to prepare a scheme for the better protection of the town in case of fire, more especially in regard to the calling of the firemen, which had hitherto been done by the police. The scheme finally adopted consists of six alarm call points, three being placed as central as possible to the zone of call for the various districts they serve, and one each at the police station and fire engine house. Alarm bells are fixed in the various firemen's houses. The working of the scheme is as follows: On an alarm of fire being given at one of the "call points" the current is transmitted to the fire engine house, where by means of a "relay switch" the whole of the firemen's bells are automatically set in action. Under this system of working the trouble from "false calls" is practically eliminated.

PUBLIC ABATTOIRS.

The question of establishing public abattoirs in the town and closing the ten private slaughter houses had for some time previous to the year 1881 been receiving the attention of the urban district council. In that year plans were prepared by the surveyor (the late Mr. Jonathan Haigh) for the erection of the present abbatoirs, and a loan for £2,000, repayable in thirty years, was obtained. The amount outstanding on this loan to date is £370.

The buildings are situate on the north side of the cattle market, and were completed in 1882. They are built of local stone, with slate roofs, the slaughter halls being lined with glazed bricks to a height of 4 ft. 6 in., the floors being paved with chequered paving bricks; water and gas are laid on, and the usual hanging rails, tubs, &c., provided.

The accommodation provided is as follows:—One public killing hall, 29 ft. by 20 ft.; seven private killing halls, 20 ft. by 14 ft.; one public pig-killing hall, 20 ft. by 14 ft.; one public cattle and sheep lair, 14 ft. by 14 ft.; seven private cattle and sheep lairs, 14 ft. by 14 ft.; ten public pig pens; one public oxen lair, 14 ft. by 14 ft.; one public sheep lair, 11 ft. by 11 ft.; one public calf lair, 12 ft. by 9 ft. 6 in.; attendants' room, stores and the usual sanitary conveniences.

The private slaughter halls and lairs are let to the various butchers at a rental of £9 12s. per annum, exclusive of gas, which is supplied through a prepayment meter. A charge of 6d. is further made for slaughtering pigs.

The administration costs for the year ending March 31st, 1917, including loan charges, &c., was £272, and the income £132, showing a loss on the undertaking of £140. This loss, though undesirable, may be regarded as a premium paid for insuring the elimination of unsound and undesirable quality meat being sold in the town.

ISOLATION HOSPITAL.

This building was erected in 1896. It is situate in the parish of Llanfoist, Abergavenny rural, and is under the

management of a joint committee of the borough and rural councils, six members being appointed by the borough and three by the rural council.

The hospital is of the temporary type of construction and has accommodation for twenty patients and staff. The cost of erection and upkeep is borne by the respective councils in the ratio of two-thirds borough and one-third rural, the administration expenses being charged against the two councils on the basis of the number of days' treatment the patients from the respective areas receive.

SEWERS AND SEWAGE DISPOSAL.

In the year 1880 the whole question of sewerage and sewage disposal was considered, and Messrs. Dudley De Salis, engineers, Westminster, prepared plans providing for sewering an area recently added to the town, relaying certain of the existing sewers, and treatment on broad irrigation lines of the sewage before discharging the effluent into the river Usk.

The whole of the sewerage system is ventilated by means of Webb's sewer gas extractor and destructor lamps, seven in number.

The area of the filter beds is 8 acres, underdrained at a depth of 6 ft. The sewage, being wholly domestic, is a "weak sewage."

WATER SUPPLY.

The water supplied to the town previous to the works constructed in 1912 and 1913 came mainly from two springs in the Llwyndû Valley, collected and conveyed to an underground tank or reservoir of 60,000 gallons capacity. In addition to the flow of these springs, the corporation also had power under the Abergavenny Improvement Act of 1860 to abstract at the point authorised by the Act a quantity not exceeding one-half of the flow of the stream Kibby, between the hours of sunrise and sunset, and such quantities as might be required between sunset and sunrise. At this point a further tank of 60,000 gallons capacity was also provided, bringing the total storage capacity to 120,000 gallons.

As is usual with springs, the yield fell off during the summer months, and recourse had then to be made to the stream supply, but the two supplies often failed to meet the demand, with the result that the higher level portions of the town obtained only an intermittent supply.

In the year 1910 the writer took contour levels in the Kibby Valley with a view to the provision of a storage reservoir, but having regard to the steep natural gradient of the valley and the width of the embankment required for a reservoir containing 10,000,000 gallons of water, and the unfavourable geological conditions revealed by trial holes, the scheme was dropped, and in 1911 Mr. E. W. Dixon, M.INST.C.E., Leeds, was called in to advise the corporation in the matter.

The scheme prepared by him, and finally approved by the corporation, consisted of the collection at their sources of twelve springs and conveying them to a dividing chamber, where the one-half of the total yield was turned into the Kibby stream in accordance with the requirements of the Act of 1860. From this point the water is conveyed to the existing storage tank at Llwyndû, and the combined quantity then conveyed to the new storage reservoir of 7,500,000 gallons capacity constructed about half a mile further down the valley, at such a level as permits of the collection and storage of the surplus water of the Llwyndû spring during the winter months.

In consequence of some movement of the hillside above the existing Llwyndû tank, endangering its stability, provision was made in the scheme for strengthening the walls.

The collection of the springs is made in brick chambers with concrete floors on the actual site of the springs, the site being fenced. The flow from the springs after collection is conveyed by cast-iron pipes to the dividing chamber, balancing or break pressure tanks being built on the line of the main aqueduct. The dividing chamber and recorder house is so arranged as to divide accurately the daily volume discharged from the springs by passing the total volume through two openings of equal size in the dividing chamber situate below the recorder house. The discharge to the stream from this chamber is effected by means of an automatically timed valve regulating the discharge from one section of the chamber, which opens and closes every alternate twelve hours. From this chamber the regulated flow of water is conveyed by means of cast-iron pipes to the Llwyndû tank.

The repairs to the Llwyndû tank took the form of an internal lining of reinforced concrete with supporting buttresses, and opening up and grouting with cement the top lining of the floor where it was found to have lifted.

The storage reservoir is of the open type, formed partly in excavation and constructed in Portland cement concrete, with bitumen sheeting incorporated in the design of the walls and floors. The valve chamber is situate at the south end of the reservoir, into which are carried the three draw-off pipes.

The total cost of the scheme was as follows: Land (11½ acres), £1,800; construction of reservoir, collection of springs, pipe line, cost of acquiring water rights, tenants' compensation, &c., £16,626; total, £18,426.

Mr. Cecil B. Ede acted as resident engineer for Mr. Dixon, and Mr. W. Clarke as clerk of works for the corporation.

CEMETERY.

In order to obtain as good a "lay out" as possible the committee asked for competitive designs, and offered premiums of £30 and £15, the premiated design and that adopted being sent in by Mr. R. Upcher, St. Levan, Cornwall.

The design of the chapel, lych gate, boundary walls and fences were entrusted to the late Mr. E. A. Johnson, architect, of Abergavenny, and the development of the lay out, roadways, &c., was carried out by the late Mr. J. Haigh, the surveyor to the council.

The accommodation provided is as follows:—

	Church.	Nonconformist.	Roman Catholic.
First class	709	659	202
Second class ...	365	332	127
Third class	386	220	193

Making a total of 3,193 grave spaces.

The site of the cemetery was undoubtedly one of the most charming in the neighbourhood previous to its being used for its present purpose, and those interested in cemetery "lay outs" will be amply repaid by visiting the cemetery, and will also be afforded an opportunity of admiring the beautiful scenery surrounding the site.

The accepted tender for the chapel, boundary walls, gates, &c., was £1,473; that for the roads, drains, &c., £1,085.

The total cost, including land, cottages on site, erection of chapel, boundary walls, roads and lay out of grave spaces was £6,900.

TOWN HALL BUILDINGS, ETC.

The town hall buildings, shops, corn exchange, and general market were built in 1870, at a cost of £13,400. The assembly room or hall on the second floor was used for entertainments, concerts, &c., but in 1905 the county council declined to renew the theatrical licence, and the justices shortly after declined to renew the annual music and dancing licence.

The general market is a large market, and at the time of its erection was undoubtedly the finest of any in the neighbourhood, every accommodation for both buyers and sellers being provided.

The cattle markets call for no comment. The markets have been established many years, and serve as a mart for the whole of the surrounding country.

HOUSING AND TOWN PLANNING.

In regard to this matter the council have secured an option of purchase of 28 acres of land for the sum of £4,200, the option to be exercised by December 25, 1920. The land is situate practically in the heart of the town, and is capable of excellent "lay out," the general contour of the ground being all that could be desired. At the present moment, with the exception of about 5½ acres, it is absorbed by allotments and land cultivated under orders issued by the War Agricultural Committee. In this direction the writer is of opinion that the question of the provision of allotments for the people will be a matter for the serious consideration of councils in the years following the termination of hostilities.

GASWORKS.

The gasworks were purchased by the corporation in 1864 for £6,500, the total expenditure to date being £37,000, and the total outstanding loans to be repaid amounting to £11,365. Towards the repayments it should be stated that the sum of £11,700 has been contributed out of revenue.

(To be concluded.)

Children and Salvage.—As a result of a three days' salvage campaign, the school-children of Stalybridge, Cheshire, have collected over a ton of paper, 3 tons of metals, 4 cwt. of rags and bones, 5 cwt. of broken glass, 4,734 bottles and jars, and a quantity of old boots. A market has already been found for the whole of the material. The collection was organised by the Sanitary Committee, and the chairman, Mr. J. H. Smith, has been personally thanked by the Director-General of National Salvage for this remarkable achievement. If such a result can be obtained in three days from a town with a population of 26,000, what might not be done if similar efforts were made all over the country?

Empire Water Power.—The conjoint Board of British Scientific Societies appointed to report with reference to the utilisation of water power in the Empire has now issued its report. The committee point out that Great Britain utilises only 8·3 per cent of its available water power, whereas Germany utilises 43 per cent. They find that the potential water power in the British Empire aggregates 50 to 70 million horse-power, much of it being capable of immediate economic development. The development of such enormous possibilities should not be left to chance, and the committee recommends that the Government should take steps to form an Imperial Board or Commission, to include representatives of all Dominions and Dependencies, to investigate the matter, and advise the State as to developments which it might assist or initiate.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Why is it that so many of the non-technical and so-called popular papers have taken up the cudgels against the present system of the administration of our roads, and more than hint that such control should be placed in other hands? Is there any real cause for grievance? And do the authors of these attacks on the present administration realise the enormous difficulties of the present situation, owing to the war, or have they ever taken the trouble to investigate the matter in a thorough manner?

* * * *

Would it not be an advantage if the subways at several of the dangerous street crossings in the Metropolis were re-named "Safety Subway," instead of Public Subway as at present? Is it not surprising how little use the general public makes of these subways, and would not such a title go far to attract attention to their object? Has it not been well stated that preoccupation of mind is responsible for a great number of accidents to pedestrians?

* * * *

Was it not very right and altogether dignified that at a recent meeting of the members of the County Surveyors' Society in acknowledging an expression of thanks conveyed to them through Mr. Cooke from the Army Council for the work done by them on main roads under their charge during the war, they should have passed a resolution asking that the appointment of a Controller of Roads and Bridges should be so modified that such control should apply to traffic only, and not to road or bridge work? Would it not be well if the council of the Institution of Municipal and County Engineers would also draw up some similar resolution so as to check if possible the movement which is now threatening?

* * * *

Is it not to be hoped that, in the numerous town-planning schemes which will be carried out when normal times are again reached, some provision will be made for housing the working classes? Is it not to be feared that in the endeavour to present schemes which will be a credit to the architect or surveyor who prepares them, the more mundane provision of cheap dwellings may be overlooked? Is there not still a very large population in this country who can only earn very low wages? And can these people be expected to pay the rents which must be demanded for the type of cottages that is designed for so-called garden cities? If these workmen's cottages are to be let at rents below their market value, will there not be unseemly scrambles for such premiated dwellings?

* * * *

Why is it we have lately heard so little of any trouble arising from the want of ventilation of our sewers? Are there not many of us who can remember the time when grievous complaints frequently arose as to smells from manholes with ventilating grids in the streets, and the controversies and discussions which took place as to the proper manner of ventilation? Is the present apparent immunity from this nuisance due to a better construction of the sewers, better means of flushing, or a greater water supply to the houses?

A Surveyor's Salary.—At a recent meeting of the Flockton, Yorks, Urban District Council the surveyor, Mr. J. W. Smith, asked for an increase of salary. The Chairman (Councillor H. Lumb, J.P.): I hope you all are aware that the cost of living is as much to him as it is to us, and I believe in everybody having a living wage. Thirty-five shillings per week is not much nowadays for a man with four children. Councillor Marsden supported an advance. It was agreed that an advance of 5s. per week be given. Councillor Kaye: Has this been given as a war bonus? The chairman: No; it has been given as wages.

Maidstone Public Baths.—The public baths at Maidstone is one of the oldest of the corporation undertakings, having been built in 1851, at a cost of £6,000, consisting originally of a number of slipper baths, with a small covered swimming bath, which was enlarged at a latter date. In the year 1895 a new swimming bath was added, 90 ft. by 35 ft., with seventy-two dressing boxes covered by a gallery capable of seating about 700 persons. The old swimming bath was reconstructed and reserved for the use of ladies, and the slipper baths have been added to and reconstructed, the number now being twenty for males and eleven for females. As Mr. T. F. Bunting, the borough engineer, observed in the course of his paper at the recent meeting of the Institution of Municipal and County Engineers, at Maidstone, public baths are not usually remunerative undertakings, but the receipts have increased by reason of the improvements made. The cost of water has also decreased by the fact that the corporation have during recent years utilised their own supply, in place of that purchased previously from the local waterworks company. In the year 1907-8 the receipts were £408. In the year 1917-8 the receipts were £1,281.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. The letter X, combinations such as X.Y.Z., and words such as "engineer" and "surveyor," should never be used.

Public Footpath Across Railway.—"Port" writes: In this urban district a public footpath crosses the railway, and my council has been approached by the railway company with a suggestion that the stile belonging to them and situated on the fencing each side of the railway should be done away with and replaced by gates, the locks of which could be taken away by the council's direction periodically so as to preserve any public rights, and adding that it would be necessary to put barbed-wire on the top of the gates to prevent children climbing over. There is a road level-crossing near the station whereat a footbridge overhead for passengers has been provided by the railway company. The public footpath in question is used as a short cut from one road to another, and is frequently used by the public. The trouble is that boys often accompanied by children get on to the line by way of the stiles, and get off the footpath a short distance to fish over the bridge into the stream underneath, and thereby place themselves in danger of being run over by the passing trains. If gates are substituted for the stiles, and locks provided on each gate, this danger would be averted, but the public would miss the short cut, and I fear that if the council agree thereto, the right of the public footpath would be prejudiced. I shall therefore be obliged if you will kindly advise me as to the law on the matter as fully as possible?

Under Sec. 61 of the Railway Clauses Consolidation Act, 1845, the railway company are bound to maintain good and sufficient gates or stiles on each side of the railway where the footpath communicates therewith. Presumably the object of this enactment is to facilitate the use of the footpath by the public. Apparently the company's suggestion is that the gates should be kept locked, so as to exclude the public from that portion of the footpath which crosses the line, except at periodical intervals. In my opinion the company have no power to do this, either with or without the consent of the council, and any consent given by the council would be *ultra vires*.

Combined Drainage.—"Complex" writes: There is a block of nine houses in this district belonging to one owner, which is drained by a combined system as follows: There is a separate drain from each house connected with a drain laid in a passage at the back of the houses, running parallel to the street, and this drain is connected with a second drain laid in another passage between the fourth and fifth house, leading from the street to the back passage. The latter drain is connected with the public sewer in the street. The tenants of the houses have the right to use both passages, but each house has its own separate entrance, private outbuildings and garden. The back passage is closed at the ends, but there is a door at the street end of the middle passage, of which each tenant has a key. I shall be glad if you will advise me who is responsible for the repair of the drains in the passages, the owner or the local authority?

In my opinion both these drains are "sewers," vested in and reparable by the local authority, but as to the drain in the back passage, only from the point at which the drain from the second house is connected with it.

Private Street Works.—"T. C. W." writes: There is an old road in this district which was formerly set out under an inclosure award as a private bridle path, but has for many years been a public highway for all purposes, though it has never been properly made up or formally adopted. The council now wish to have it made up and sewered at the expense of the frontagers under the Private Street Works Act, 1892. Will you kindly advise whether they have power to do so?

Assuming that the road did not become a public highway before the passing of the Highway Act, 1835, and that it has not been formally dedicated under sec. 23 of that Act, it is not, in my opinion, "reparable by the inhabitants at large," and can therefore be dealt with under the Act of 1892, as desired. See *Cababé* v. *Walton-upon-Thames Urban District Council* (1914), A.C., 102.

Erratum.

At p. 73 *ante*, 1st column, line 43, for "span" read "repair."

St. Pancras Electricity Profits.—A profit of £14,500 was made on the St. Pancras municipal electricity undertaking last year.

Women as Road Sweepers.—The following is quoted in a provincial paper as the opinion of the foreman who has charge of the women road sweepers in a town in the South of England: "They're too careful for rough road work. When a woman sweeps she sweeps thoroughly, goes in all the corners, and walks down the road after stray leaves or bits of paper. In fact, she doesn't sweep a road, she tidies it up. I'm everlasting telling them that the high road isn't a front parlour, but they can't get out of the habit. If I don't keep an eye on them I shall find 'em dusting the lamp-posts next. But that's their only fault; they're too thorough, and that makes 'em slow, so that the men have to pull up every hour or so to let them get ahead."

HOUSING NOW AND AFTER THE WAR.

CONFERENCE OF GREATER LONDON AUTHORITIES.

A conference of Greater London authorities has been convened by the London County Council for October 30th to discuss the most effective methods for improving housing conditions.

WELSH COMPETITION AWARDS.

The following awards were made in connection with the architectural and town-planning competitions arranged by the Welsh Housing and Development Association under the auspices of the Welsh National Eisteddfod, 1918:—

LAY-OUT PLAN OF A LOCAL BUILDING SITE.

Prize of £5 5s. awarded to Mr. T. Gbib, Wigfa, Springfields, Aberavon (total number of competitors, seven). Adjudicator, Mr. Henry E. Stilgoe, M.INST.C.E., city engineer, Birmingham.

COTTAGES AND LIVING-IN QUARTERS FOR WELSH AGRICULTURAL LABOURERS.

Class A.—Living-room, scullery, and three bedrooms. Prize of £50 awarded to Mr. J. Austin Lloyd, Bella Vista, Powfort, Annan, from among eighty-three competitors.

Class B.—Living-room, parlour, scullery, and three bedrooms. Prize of £50 awarded to Mr. H. Heathman, 10 Station-road, Bristol, out of fifty-two competitors.

Class C.—Accommodation at the discretion of competitors, but with a minimum of three bedrooms planned entirely or mainly on one floor. Prize of £50 divided equally between Mr. J. Austin Lloyd, Powfort, Annan, and Miss E. D. Blacker, 20 Victoria-square, Clifton (number of competitors, thirty-six).

DESIGN FOR LIVING-IN QUARTERS FOR UNMARRIED FARM LABOURERS.

Prize of £5 5s. awarded to Mr. T. Gibb, Wigfa, Springfields, Wasted-road, Pontypridd. A consolation prize of £5 5s. was awarded to Mr. Herbert L. North, B.A., F.R.I.B.A., Llanfairfechan, North Wales (number of competitors, twenty-five).

The adjudicators in the foregoing competitions were Prof. Patrick Abercrombie, F.R.I.B.A., Mr. J. Cook Rees, president, South Wales Institute of Architects, Mr. D. M. Jenkins, ASSOC.M.INST.C.E., chairman, South Wales District Institution of Municipal and County Engineers, Mr. D. Lleufer Thomas, M.A., J.P., and Lady Boston. The plans were on exhibition at the Arts and Crafts Exhibition at Neath during the Eisteddfod week, and arrangements are being made to exhibit these in every county in the Principality. A selection of them will also be reproduced in book form.

Cannock Urban District Council propose to build forty-four houses after the war.

Bridlington Rural District Council have approved a scheme for the erection of forty-four cottages in various parts of the district.

Portsmouth Town Council are negotiating for the purchase of 500 acres of land at Portsdown Hill for the erection of houses.

Chapel-en-le-Frith Rural District Council have approved a scheme for fifteen additional houses at Whaley Bridge, and ten at Whitehough.

Panteg Urban District Council are negotiating for the purchase of 36 acres at Kemys Vach, Griffithstown, for the purpose of a housing scheme.

Grays Urban District Council have agreed to purchase 67 acres of the Grays Hall estate, at the rate of £150 per acre, for a housing scheme.

Norton Rural District Council have appointed a committee to go round the district with an architect and prepare estimates and plans of the cottages required.

In the House of Commons, the Chief Secretary stated in answer to a question that it had been estimated by the Committee on Housing of the Irish Convention that £27,000,000 was the total amount of capital expenditure required to deal with the housing requirements of Ireland after the war. Mr. Shortt said he was not aware that a special sum had up to the present been set apart to meet the Irish case.

The question of housing and town planning has occupied the attention of the Corporation of Maidstone for the past few years. One site of 5 acres has been acquired in the Western area, part to be laid out as a recreation ground, and part for the erection of workmen's cottages. The plans for cottages on this site have been prepared. Competitive designs for the laying out and erection of dwellings of an estate of 14 acres belonging to the corporation at the western extremity of the borough, and adjoining the tramway route, have been received, and a selection has been made. The scheme will provide for the erection of 170 houses, and the carrying out is only delayed until conditions permit of a start being made. The corporation have now decided upon the preparation of a town-planning scheme to include the whole of the undeveloped land within the borough boundary.

INSTITUTION OF MUNICIPAL ENGINEERS.

COUNCIL MEETING.

At the council meeting held in London on August 8th the following applicants were recommended for admission, and such recommendations will be ratified at the next council meeting if no written objections are lodged within fourteen days:—

Barton, A., surveyor, Boston Rural District Council (transfer).

Brown, T. R., surveyor, Tow Law Urban District Council.

Chapman, F. R., surveyor, Bedford Rural District Council.

Coles, W. E., surveyor, Stratford-on-Avon Rural District Council.

Conway, M. A., assistant county surveyor, Sligo.

Hudson, S., surveyor, Mottram-in-Longendale Urban District Council.

Leech, M. J., assistant county surveyor, Roscommon.

Leigh, Jas., surveyor, Walton-le-Dale Urban District Council.

Lobley, F. J., city engineer and surveyor, Chichester.

Lonagan, M. J., assistant county surveyor, Clonmel.

MacKenzie, A. F., burgh surveyor, Inverness.

Mitchell, S. T., district main road surveyor, Norfolk County Council.

Nicholls, J. C., surveyor, Newport Pagnell Rural District Council.

Raynor, C., surveyor, Stapleford Rural District Council.

Robson, J. T., sanitary surveyor, Auckland Rural District Council (transfer).

Rubie, W. C., district surveyor, Birmingham.

Mr. R. B. Grice, articled pupil, Douglas Borough Council, was elected to studentship.

The following nominations of vice-presidents have been made by the districts mentioned, and the names will be included in the ballot paper: Messrs. John Bailey (E. and N.E. Districts), C. W. Hall (Northern District), and T. C. Barralet (Southern District).

The annual meeting will be held at Southall on October 9th and 10th, and members are requested carefully to note the date with a view to attendance. Offers of papers are invited, and early submission is requested.

The Finance Committee reported on the highly satisfactory condition of the finances, and pointed out that the receipts for July were three times as great as those for July last year. Cheques were drawn in settlement of all liabilities to date.

A number of further cases in which bonuses had been granted owing to the circular letter of the institution were reported. Members are requested to send to the secretary particulars of all such cases as may come to their knowledge.

The secretary reported that he had written to the Coal Controller drawing his attention to the fact that clerks and other officials, and occasionally councillors, were being appointed coal overseers.

A vote of thanks was passed to Mr. G. A. Brierley for the presentation of a volume to the library, and the council expressed the hope that other members would follow the example set.

RECENT PUBLICATIONS.*

STERLING DECIMAL COINAGE. By W. L. Craig, B.C.E. (MELB.), M.INST.C.E. Price 2s. 6d. nett. London: Effingham Wilson.

Prior to the re-coinage of silver and gold in 1816-17 immediately after Waterloo, the Cabinet was urged both inside and outside the House of Commons to decimalise our money. This great commercial question was side-tracked until the period 1850-1870, when a bitter struggle ensued between the decimalists and the reactionaries. More recently the Associated Chambers of Commerce of the United Kingdom, the Decimal Association of London, and the Institute of Bankers distributed a joint circular in November, 1917, under the title of "British Decimal Coinage." A Bill founded upon this circular was introduced into the House of Lords on April 24th, 1918, by Lord Southwark, and read a first time. In this book the author criticises the provisions of the Bill in detail, and suggests an alternative scheme based upon the crown. His exposition will prove of the greatest interest to all students of this important and complex subject.

London Water Supply.—Under present conditions, states the report of the Metropolitan Water Board, it would be practically impossible to render an additional supply of water available from the Thames until after the termination of the war. The only way of increasing the supply would be to bring into use wells at Shortlands, Sandridge, and Merton Abbey.

* Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Dublin T.C.—It is proposed to erect a sub-station for electricity purposes at North Wall Docks, through the Workshops Committee.

Halifax T.C.—The town council have approved the purchase of property adjoining the town hall for the enlargement of office accommodation.

Rhyl U.D.C.—The council are considering in committee the question of the disposal of Rhyl Pier to the Government. This is the sequel to a letter from the Ministry of Munitions in reference to the proposal that the piér, which has been closed to the public for many years, owing to its instability, should be sold as scrap iron for national purposes. It was pointed out that the metal of which the pier is constructed is urgently wanted for shell-making, and is at present worth many thousands of pounds. If now dealt with it would be a benefit to the nation as well as profitable to the town, whereas if allowed to remain in its present derelict condition it would probably collapse and be of use to nobody. The council, it may be added, are in negotiation with the Treasury with a view to the acquirement of the freehold of the pier site, which is necessary before the structure can be removed.

REFUSE COLLECTION AND DISPOSAL.

Consett U.D.C.—Having discovered that waste goes on to the extent of 20 per cent of the fuel used in houses, the council have instructed the man to save these cinders, riddle them, and sell them back to consumers in the coming winter, when fuel will be more valuable.

Edinburgh T.C.—The cleansing department, in addition to their other salvage activities, recently undertook the collection of nut shells and fruit stones in the city. These shells and stones are urgently wanted for war purposes, and the collection was started as soon as the Government's need for this valuable material was made known. The hotels and restaurants in the city, the Zoo, and other likely places were communicated with, and it is hoped that the department will be able to send a large consignment to the central depôt in England, where the shells and stones are treated.

ROADS AND MATERIALS.

Aberdeenshire C.C.—The road surveyor to the Huntly District Committee reports that the heavy wood traffic is having a disastrous effect on newly-coated roads. The metal was displaced ere the coat had time to consolidate, the surface and shape were destroyed, and the slackened roadways were quickly pulverised. With respect to this the clerk stated that he had received an intimation that the Government had agreed to pay all damage to roads by extra wood traffic subsequent to March 1st, but there was no mention of payment for damage prior to that date. It was stated that the Government would probably send an inspector to investigate the matter.

Cardiganshire C.C.—The council are in communication with the Radnorshire County Council with respect to a scheme for the construction of a road between Tregaron and Abergevesin.

Denbigh C.C.—Arising out of the Main Roads Committee's report with reference to the repair of the Ruthin road near Bwlchgwyn, the reconstruction of which was stated to be progressing slowly owing to labour shortage, it was stated that the road was being repaired with silica, the hardest stone which could be produced in the county, and when the work was completed it would be one of the best roads in the district.

Dewsbury T.C.—The council have agreed to purchase property in High-street, Earlsheaton, for a street improvement.

Dulverton R.D.C.—Complaint was made as to the restricted area in which German prisoners are allowed to work (3 miles from the town) on the roads. The roads were rapidly deteriorating, and there was no local labour available. The clerk was instructed to write to the authorities concerned, and endeavour to persuade them to allow the prisoners to work in a larger area. The surveyor, Mr. E. Babb, said he would give women a trial, as advised by the Somerset county surveyor.

East Suffolk C.C.—The Roads and Bridges Committee reported that on several sections of road subjected to continuous military traffic the tarred surface had worn considerably, clearly indicating that the treatment could only be regarded as a temporary measure. The total expenditure on the main roads maintained directly by the county council, excluding salaries and travelling expenses, amounted to £25,050, or £80 2s. 5d. per mile, against £20,577, or £65 9s. 3d. per mile. The serious deterioration of the main roads was proceeding much quicker than could be overtaken by ordinary repairs with a depleted staff. The county surveyor, Mr. W. Jervis, stated that several claims had been settled by the military authorities and others were pending. The council had asked a sub-committee to consider the question of employing German prisoners on the roads.

Foleshill R.D.C.—It was reported that the final allocation of materials for road repair was only 50 per cent of the quantity usually used.

Holme Cultram U.D.C.—The council propose to carry out an improvement at Balladoyle road corner, and an intimation has been received that the County Highways Committee would make a contribution of £40 towards the cost.

King's Lynn T.C.—The borough surveyor, Mr. A. J. Smith, has received instructions to prepare an estimate of the cost of improving St. John's Extension Walk.

Monks Kirby R.D.C.—It was reported that the Road Board had declined the council's application to increase the grant towards tar-spraying the Watling Street road, estimated to cost £146, towards which the board were only willing to grant £50. The chairman remarked that the contribution was quite inadequate and very unjust. There was very little local traffic on the road, it being practically all through motor traffic, and yet the council had to maintain it.

Stockbridge R.D.C.—The surveyor, Mr. W. J. Ayles, reported that he had been over the road from Grateley to Over Wallop, and he was satisfied that on the two years to March, 1919, they had saved £120 through the repairs being done by the Road Board. He had no doubt that they would save that £60 a year for a further three years while it was under military control before repairs would be required to be done by the district council. The council decided to pay the Road Board £120 for the cost of repairs which had been saved to the district up to next March, and to pay £60 each year the road was kept up by the Road Board.

Towyn and Aberdovey U.D.C.—An agreement has been reached with the owners of the Tydynhhys-y-gader estate for the widening of the road from Farcroft, and the work is to be commenced as soon as practicable.

Wilts C.C.—Reference was made to the large amount of damage done to main and district roads by timber hauling traffic. Circulars had been sent out to all surveyors, and it was found that up to June 30th there had been damaged 123 miles of county roads and 109 miles district, a total of 232. Since then other reports had come in, so that now it was estimated that 300 miles of roads in the county had been damaged by this traffic. The Road Board had been informed, and so far claims had been settled satisfactorily. Two hundred tons of metal had been allowed per mile for repairing.

SEWERAGE AND SEWAGE DISPOSAL.

Beverley T.C.—The Local Government Board are being asked to sanction the erection of purification plant in connection with a scheme for the treatment of effluents from local factory works.

Buckingham R.D.C.—It has been agreed to lay a new sewer in Mill-lane, Westbury, at an estimated cost of £61.

Dublin T.C.—A report was considered from the Improvements Committee recommending the payment of a bonus of £350 to Mr. T. H. Rochford in consideration of an improved method invented by him for the renewal of manhole covers. Alderman Quaid urged that there was no independent expert opinion showing the practicability of the method. Mr. O'Looney said that the method had effected a big saving. The corporation would have the sole rights of the patent if the motion was passed. The matter, after a discussion lasting an hour and a-half, was referred to a committee of the city council.

Poole R.D.C.—Messrs. Dodd & Dodd, engineers, wrote that they hoped to be able to submit a complete scheme of sewerage for Cranford about the first week in September. With respect to land a site was offered at £20 an acre, and the council arranged for a deputation to interview Lord Wimborne, the owner, on the subject.

Rotherham R.D.C.—A report was submitted on the sewage works in which allusion was made to the excellent results obtained from the employment of women.

Sudbury T.C.—The deputy surveyor, Mr. Rampling, having submitted a report on the system of surface drainage and storm-water sewers in the borough, the council agreed to carry out the following works:—(1) The King-street scheme at an estimated cost of £89, the work to be proceeded with forthwith; (2) the Croft-road scheme at an estimated cost of £70; (3) the Ballingdon scheme at an estimated cost of

£440; (4) the Friars-street scheme so far as the same relates to the proposed new outlet at an estimated cost of £40; and (5) the Church-street scheme at an estimated cost of £80, utilising the iron pipes from Friars Meadow.

WATER, ELECTRICITY, AND GAS.

Ashbourne R.D.C.—With regard to the public inquiry which the Local Government Board held recently on the council's application for power to borrow £5,000 to provide an auxiliary water supply, it was reported that as a result of their inspector's report the L.G.B. were unable to regard the case as one which justified them in sanctioning the loan. The board pointed out that Messrs. Neslé were willing for the council to use water from their wells if necessary, and the council should make arrangements to connect these with their mains. The auxiliary scheme should be deferred till after the war, when the whole matter should be considered. They suggested that the council should try and secure a source of supply not liable to pollution. Mr. Coates said he could not understand the L.G.B. recommending the council to obtain a supply which was nearer the contamination. No action was taken.

Brighton T.C.—The electrical engineer recommends the installation of a new 3,000-kw. turbo-alternator at the electricity works.

Clayton U.D.C.—An agreement has been reached between the council and the Bradford Corporation for a supply of electricity in the urban area, and the council have resolved to make application for a Provisional Order for electric lighting.

Harrogate T.C.—The town council have passed a resolution of protest against the Government proposals to take over electricity generating stations, and decided to oppose any Bill introduced for that purpose.

Kirkburton U.D.C.—The council have approved the application of the Huddersfield Corporation to the Board of Trade for a provisional order authorising the corporation to supply electricity within the urban area.

Macclesfield T.C.—The Water Committee recommend the appointment of Messrs. G. H. Hill & Sons, Manchester and Westminster, as consulting engineers to report upon the Macclesfield Forest site in connection with the water supply scheme, and the town council have referred the recommendation to a meeting of the General Purposes Committee in order that certain objections to the scheme may be considered prior to application being made to Parliament for the necessary powers.

Nuneaton T.C.—It was reported that there had been a loss on the electricity undertaking during the last quarter of £449, as against £825 last year. The Water Committee's report also shows a loss, due, it was stated, to the cost of special repairs.

Sheffield T.C.—The city council have approved the minutes of the Electric Supply Committee dealing with the proposed borrowing by the council of £1,203,950 in connection with the power-house and equipment for the main scheme at Blackburn Meadows. An addition to the minutes as to the purchase of additional machinery was agreed to. An intimation has been received from the Treasury that it has no objection to the proposed borrowing by the city council of £1,203,950 in connection with the Blackburn Meadows extension scheme.

Skelton and Brotton U.D.C.—Complaint has been voiced in the council at the unsatisfactory nature of the water supply, and a motion has been approved appointing a committee to consider the question of taking over the works of the Cleveland Water Company.

Public Works Loans.—From the forty-third annual report of the Public Works Loan Board, issued on Monday, it appears that, in accordance with the arrangements made with the Lords Commissioners of His Majesty's Treasury, loans have only been granted by the board where it could be shown that their purpose was (*a*) urgently necessary in the national interest for the furtherance of the war, or (*b*) of urgent necessity for reasons of public health. The board have thus continued their policy of assisting in curtailing capital expenditure and fresh borrowings by local authorities, and others, in view of the necessity of preserving the capital resources of the country in the national interests. Sanction has also been given to loans which satisfied the conditions (*a*) or (*b*) above referred to, and the effect of these restrictions has been very materially to reduce the amount advanced by the board during the year. The Public Works Loan Commissioners, during the financial year 1917-18, made seventy-one advances for sums amounting to £316,517, as compared with 239 advances for sums amounting to £680,312 in 1916-17. Of the sum of £316,517, £275,625 was advanced on the security of local rates, and £40,892 on the security of property. The rate of interest in respect of the £316,517 advanced averaged £4 11s. 11d. per cent, as against an average rate of £4 9s. 6d. per cent in 1916-17 and £3 11s. 1d. per cent in 1912-13.

PERSONAL.

Mr. Evan Williams, borough surveyor of Llandovey, has been appointed local fuel overseer.

Mr. W. J. Coekrill, borough surveyor of Yarmouth, has been appointed local fuel overseer.

Mr. D. Thomas, surveyor to the Ammanford Urban District Council, has been appointed fuel overseer at a salary of £105 a year.

Mr. J. L. Redfern, borough surveyor of Gillingham, has had his salary increased by £50 a year, and has also received a war bonus of 5 per cent.

Mr. J. W. Kirsopp, surveyor to the Carlisle Rural District Council, has had his salary increased to £210 a year, plus £20 war bonus, this to cover all expenses.

Mr. W. S. Lythgoe, highway surveyor to the Penrith Rural District Council, has had his salary increased from £200 to £220 a year, and his travelling allowance increased from £40 to £50.

Lieutenant H. Banks, after serving at the Front in an engineering battalion, has been discharged from hospital, and he has now rejoined the Blackpool borough surveyor's department at a commencing salary of £300 a year.

Mr. J. F. Willcox, M.INST.C.E. (Willcox and Raikes), Birmingham, has been instructed by the Stourport Urban District Council to prepare details for the public inquiry which will be held in connection with the proposed extensions of the boundaries over which that authority have jurisdiction.

Mr. W. E. Orchard, borough surveyor of Pembroke, who is single and Grade 2, has reeeived a ealling-up notice, but, owing to certain steps which have been taken, this has been temporarily suspended. The town council have adjourned meanwhile the question of appointing a temporary borough surveyor.

APPOINTMENT OPEN.

BROMSGROVE URBAN DISTRICT COUNCIL.
APPOINTMENT OF SURVEYOR AND INSPECTOR.

The above Council invite applications for the post of Surveyor and Inspector of Nuisances.

The salary will be at the rate of £260 per annum. The appointment will be for the period of the war, and for twelve months afterwards, and will be subject to the approval of the Local Government Board.

The person appointed must be a fully competent and experienced district surveyor, and possess the Certificate of the Sanitary Institute, or the Sanitary Inspectors' Examination Board, and will be required to devote the whole of his time to the duties of the office.

Full particulars of the appointment, and duties, may be obtained from the undersigned.

Applications, stating age, qualifications, and experience, with copies of not more than three recent testimonials, to be sent to the undersigned on or before Wednesday, the 4th September, 1918.

FRANCIS J. RUSSON,
Clerk.

Town Hall,
Bromsgrove.
August 21, 1918. (3,857)

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

ASSISTANT SURVEYOR.—August 29th.—Adwick-le-Street Urban District Council.—Mr. G. Gledhill, engineer and surveyor, Council Offices, Adwick-le-Street, Doncaster.

ARCHITECT AND SURVEYOR.—August 30th.—Gellygaer Urban District Counеil.—Mr. Frank T. James, clerk, Council Offices, Hengoed, Glam.

SANITARY INSPECTOR.—August 31st.—Beckenham Urban District Council.—Mr. T. C. Cole, deputy clerk, Council Offices, Beckenham.

FOREMAN.—September 1st.—Cramlington Urban District Council.—Cramlington Council Offices, Cramlington, Northumberland.

SURVEYOR.—September 5th.—Failsworth Urban District Council. £200 a year, with £50 war bonus.—Mr. H. C. Broome, clerk, Council Offices, Failsworth, Lancs.

TEMPORARY CLERK.—Hampstead Borough Council. 34s. per week and 19s. war bonus.—Mr. Oliver E. Winter, borough engineer, Town Hall, Hampstead, N.W. 3.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

GLOUCESTER.—September 9th.—For the erection of a pavilion of twelve additional beds at the tuberculosis block of the Oban hospital.—City Surveyor, Guildhall, Gloucester.

Engineering: Iron and Steel.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories. &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

BURLEY AND MENSTON.—The Joint Sewerage Board are offering for sale two complete suction-gas producers.—Mr. Harry Riding, engineer and surveyor, Council Offices, Menston, near Leeds.

CAERPHILLY.—The urban council offer for sale a Merryweather's improved sliding carriage telescopic fire escape.—Mr. T. H. Richards, Council Offices, Caerphilly.

Sanitary.

BLACKWELL.—For the construction of works of surface drainage and storm overflow.—Mr. H. Silcock, surveyor, Rural Council Offices, 67 Westgate, Mansfield.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

AUGUST.

24.—Institution of Municipal Engineers: South-Eastern District meeting at Aylesbury.

SEPTEMBER.

14.—Institution of Municipal and County Engineers: Meeting at Bridgwater.

20-21.—Institution of Municipal and County Engineers: Meeting at Middlesbrough.

27-28.—Institution of Municipal and County Engineers: Meeting at Penarth and Barry.

APPOINTMENTS OPEN.

STOURPORT URBAN DISTRICT COUNCIL.
ENGINE DRIVER.

The above Council invite applications for the appointment of Engine Driver at the Sewage Pumping Station. Applicants must be ineligible for service in H.M. Forces, and must have had practical experience in the working and management of gas engines and pumping machinery, and be able to carry out small repairs. A list of the duties may be obtained by forwarding a stamped addressed envelope to the Council's Surveyor, Surveyor's Office, Stourport. Wages £2 15s. per week. Applications, stating age and experience, accompanied by copies of three recent testimonials, should be sent to the undersigned so as to be received not later than August 31st, 1918.

A. D. CAPEL LOFT,
Clerk to the Council.

Stourport.
August 12, 1918. (3,846)

URBAN DISTRICT OF FAILSWORTH.
APPOINTMENT OF SURVEYOR.

The Failsworth Urban District Council invite applications for the above position, at a salary at the rate of £200 per annum plus a war bonus of £50 per annum.

Applicants must be qualified persons having previous experience and training in the office of a Borough or Urban District Council Surveyor.

The person appointed will be required to devote the whole of his time to the duties of the office, and will not be allowed to undertake any private practice whatever.

Applications, stating the age, present occupation, and past experience of the applicant, and accompanied by copies of not more than two recent testimonials, to be sent addressed to the undersigned, not later than the 5th September next.

H. C. BROOME.
Clerk to the Council.

Council Offices, Failsworth.
August 15, 1918. (3,847)

SOMERSET COUNTY COUNCIL.

Wanted, temporary Assistant in County Surveyor's Office. Must have good knowledge of modern road and bridge construction, be an active motor cyclist, and ineligible for the Army (reason to be stated). Apply, giving full particulars of experience, salary required, &c., to

GORDON R. FOLLAND,
Acting County Surveyor.

Wells, Somerset. (3,853)

STEAM ROLLER DRIVER (ineligible)—General work when not rolling. State wages required; permanency.—Apply Mr. G. William Lacey, Borough Surveyor, Oswestry. (3,856)

OFFICIAL NOTICE.

NOTICE TO HAULIERS OF TIMBER.

Attention of Hauliers of Timber is directed to Army Council Order of 15th March, 1918, Sub-section 4, which is set out hereunder, whereby certain information is required to be given with regard to Timber Haulage.

The necessary forms for the purpose of supplying the required information may be obtained on application to County Surveyors.

The forms must be completed and rendered in duplicate.

ARMY COUNCIL ORDER ABOVE REFERRED TO.
HAULAGE OF TIMBER.

Whereas with a view of preventing the congestion of traffic and excessive damage to public roads outside the Administrative County of London being caused by the haulage of timber, it appears to the Army Council expedient to provide for the regulation thereof in manner hereinafter mentioned. Now, therefore, the Army Council, in pursuance of powers conferred on them by Regulation 5c of the Defence of the Realm Regulations and all other powers enabling them in that behalf, hereby order as follows:—

(1) For the purposes of this Order the expression "timber haulage" means the haulage and transport of timber from the site where it was felled, except where the aggregate weight of the timber to be transported does not exceed 50 tons.

(2) The owner or other person having control or management of any vehicle used in timber haulage on any public road outside the Administrative County of London shall obey any directions in writing issued by the Road Control Officers appointed by the Army Council for the purpose of controlling such traffic.

(3) A Road Control Officer, subject to any general or special instructions he may receive from the Army Council, may:—

(*a*) After consultation with the Local Highway Authorities and as respect roads in the Metropolitan Police District with the Commissioner of the Metropolitan Police, and where necessary with the Military Authorities select the routes to be used for timber haulage and direct the use of any particular route or the diversion of the traffic or any part thereof from one route to another, in such manner as may be considered most conducive to the prevention of damage to the roads or the congestion of traffic thereon.

(*b*) Give directions for prohibiting the use of timber haulage on such roads as may be specified in the directions of vehicles of such type as may be so specified, where such restriction is considered expedient to prevent avoidable damage to the roads, and other means of transporting the timber can be made available.

(4) Before commencing after the date of this Order any work of timber haulage the owner or other person having the control or management of any vehicle to be used for the purpose shall give at least one week's notice in writing to the County Surveyor of the County or Borough Engineer of the county borough, or if more than one of each county or county borough through which the timber is to be transported, specifying:—

(*a*) The approximate date when the haulage will begin.

(*b*) The approximate tonnage to be transported.

(*c*) The type or types of vehicles to be used in hauling or transporting the timber.

And the owner or other person having control or management of any vehicle which is at the date of this Order being used in timber haulage shall within one (week) after that date give similar notice in writing specifying the approximate tonnage remaining to be transported and the type or types of vehicles used. References in this clause to the County Surveyor shall in relation to Scotland be construed as references to the Road Surveyor or official charged with the supervision of the roads by whatever name called.

(5) Any person affected by this Order who fails to comply with the provisions thereof or with any directions given by any Road Control Officer thereunder will be guilty of a summary offence against the Defence of the Realm Regulations and liable to the penalties mentioned in those Regulations.

(6) In the application of this Order to Ireland the expression "local highway authorities" means the Council of the county or county borough in which the road is situated, or in the case of a road the entire maintenance of which is undertaken by the Council of an urban district, that Council.

(3,854) By Order of the Army Council.

APPOINTMENTS OPEN.

BOROUGH OF HAMPSTEAD.
Required at once in the Borough Engineer's Department, a Temporary Male Clerk. Shorthand and typewriting necessary; must be ineligible for military service. Weekly salary 34s. and 19s. war bonus.

Applications in own handwriting, stating age and qualifications, with copies of recent testimonials, to be addressed to
OLIVER E. WINTER, M.INST.C.E.

Town Hall,
Hampstead, N.W. 3. (3,848)

ENERGETIC AND COMPETENT GENERAL FOREMAN for road and other Council work wanted. Ineligible for Army. Application by letter, stating age, wage required, and accompanied by copies of two or more recent testimonials, must reach Cramlington Urban District Council, Council Office, Cramlington, Northumberland, not later than September 1st, 1918. (3,852)

APPOINTMENTS WANTED.

A WELL EDUCATED AND EXPERIENCED YOUTH seeks situation in Municipal Engineer and Surveyor's Office, in London area preferable.—Write, stating salary offered, &c., to Box 1,667, the Office of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4. (3,850)

ROAD OR GENERAL FOREMAN (44), discharged, ten years in last situation as General Foreman in Urban District Council; excellent testimonials.—Box 1,655, Office of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4. (3,855)

MISCELLANEOUS.

FOR HIRE, 10-ton and 12-ton Steam Road Rollers and Scarifiers, with or without drivers.—W. W. Buncombe, Engineer, Highbridge, Somerset. Telephone, 12 Highbridge.

WANTED, all classes of Waste Iron and Metals, in truck loads.—John Jackson & Company, Limited, Balmoral Iron Yard, Scotstown, Glasgow. (3,849)

SALE BY AUCTION.

The Hospital Site, near the Union House, Stanford Rivers, Ongar, Essex.

CHARLES FOSTER & SON have received instructions from the Ongar Rural District Council to SELL by AUCTION, from the above, on THURSDAY, August 29th, 1918, at 2 o'clock precisely:—

Two Valuable Large Isolation Hospital Tents with floors, stoves, pipes, poles, stays and ropes complete.

One Kitchen Tent, with ditto.

Three Nurse's Tents with ditto.

A Capital pair-horse Ambulance, with rubber tyres, patent axles, poles, shafts, lamps and cushions complete.

Two Portable Iron Coppers with pipes, quantity of iron bedsteads, cane seat and Windsor chairs, galvanised baths, pails, emamelled culinary and kitchen utensils, oil stoves, patent mangle, earth closet and numerous other effects.

May be viewed the morning of sale, and catalogues obtained at the Place of Sale and of the Auctioneers, Ongar, Essex.

Note.—The Tents will be shown standing on the site, and may be viewed three days previous to the Sale. (3,851)

PREPARATION FOR EXAMINATIONS.

COMPLETE COURSES OF PREPARATION for the Examinations of The Surveyors' Institution, the Institution of Municipal and County Engineers, &c., are conducted by Messrs. PARRY, BLAKE & PARRY, who will be pleased to send full particulars or to give any advice with respect to the Examinations.

Address: 82 Victoria-street, S.W. 1. Telephone: Victoria 6680.

CORRESPONDENCE COURSES for A.M.I.C.E., Stud.I.C.E., Municipal and County, Sanitary Science and Sanitary Inspectors, P.A.S.I. and F.S.I. Exams., by a Surveyor, who is F.S.I., A.M.I.C.E. and Grad.M. and Co.E., all by Exam., with 23 years' municipal and 13 lecturing and coaching experience, assisted by D.Sc.(Lond.), M.A.(Camb.), with high mathematical honours. Record for past 3 years, all Exams., 90 per cent p. Exceptionally low fees; easy payments.—For further details and testimonials apply Box 892, Office of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4.

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH
EXPANDED METAL.

EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet.
Mr. Samuel Hutton, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED
(Patentees and Manufacturers of Expanded Metal).
Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.
Works: STRANTON WORKS, WEST HARTLEPOOL.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. AUGUST 30, 1918. No. 1,389.

Minutes of Proceedings.

Fire Brigades and Fire Prevention.

The recent case of *Thurrock Urban District Council* v. *Grays Chemical Works, Limited*, is of special interest to the councils of urban districts in which fire brigades are provided. The powers of urban district councils with respect to fire extinction are conferred by Secs. 32 and 33 of the Town Police Clauses Act, 1847, which are incorporated (as to urban districts) with the Public Health Act, 1875, by Sec. 171 of that Act. Sec. 32 authorises the council to purchase or provide engines, fire escapes, &c., to purchase, keep, or hire horses, to provide places for keeping the engines, and to employ firemen and make rules for their regulation. Sec. 33 empowers them to send the engines, &c., *outside* the district for extinguishing fire, and provides that the owner of the buildings where the fire has occurred shall "in such case" defray the actual expense incurred, and shall also pay a reasonable charge for the use of the engines, &c., and the attendance of the firemen, the amount (in case of dispute) to be settled by two justices. Sec. 32, however, is silent as to any payment to be made by the owner of the premises, and it has been held that the express power given by Sec. 33 to charge when the engines, &c., are sent out of the district impliedly negatives the right to charge when they are employed within the district. (*Bridlington Local Board* v. *Bower* [38 J.P., 737.]) But, according to the decision in the Thurrock case, this implied negative only applies in the case of actual fire, or a reasonable apprehension of fire. The facts in that case were briefly as follows: The roof of a wooden nitrating house, forming part of the defendants' chemical works at Grays, within the council's district, collapsed, owing to a heavy fall of snow, and broke some carboys of nitric acid, causing great danger of fire and explosion, there being a large quantity of picric acid on the premises. The fire brigade was summoned and prevented an outbreak of fire, and by the end of the day there was small risk of an outbreak, except during the removal of the *débris*. At the request of the defendants' manager, however, four of the firemen remained on the premises with fire-extinguishing appliances for six days. Mr. Justice Sankey held that it was not possible to construe Sec. 32 as meaning that a person within the district was entitled to the use of the fire engine gratuitously only if fire had actually broken out, and said that, in his opinion, if there was a fire, or a reasonable fear of fire, a person was entitled to summon the fire brigade of the district without payment. On the other hand, however, the learned judge held that if the brigade were summoned without reasonable fear of fire, or to render services which were unnecessary, or which the person summoning them could perform himself, then the ordinary principles of the common law applied, and he was bound to pay for services rendered to him at his request. Applying this interpretation of the section to the facts of the case, his lordship held that it was reasonable and proper for the defendants to summon the fire brigade on the first day, and they were not bound to pay for that day, but that they were not entitled to the services of the brigade on the subsequent days, as they could have dealt with the situation themselves. In the result he gave judgment for the council for £55, instead of the £81 9s. 6d. which they claimed. We should think this decision will give general satisfaction. The maxim "Prevention is better than cure" applies with peculiar force to an outbreak of fire, and there seems to be no valid reason why those who would be entitled to the gratuitous services of the brigade in extinguishing fire should have to pay for their services in preventing fire, where, without their assistance, there is every probability of an outbreak; while, on the other hand, where the risk is small and can be adequately guarded against without their aid, it is only fair that those who desire the services of the brigade should pay for them.

Wood Construction and Dry Rot.

The attention bestowed upon timber production, and the treatment of wood for commercial purposes in Canada, as also in America, is such that much useful and illuminating information issues periodically from the departments which deal with this matter. The Forest Products Laboratories of Canada have frequently had occasion to draw attention to the serious financial losses resulting from the ravages of so-called dry rot in mill or factory buildings of wood construction. Cases in which this trouble has occurred in Canadian buildings have been carefully investigated, and one of them, as related in the *Canadian Engineer* by Mr. W. Kynock and Mr. R. J. Blair, members of the laboratories staff, which was under observation for upwards of a year, afforded a typical example of a state of affairs which could have been entirely avoided had those concerned in the erection of the building been guided by the necessary knowledge of the technology of timber—which is, by the way, hardly to be expected of them—and the mechanism of the decay of wood. Briefly, the destruction proved so complete that the wood had to be replaced entirely with reinforced concrete. The decay of wood, it is pointed out, is due to the action upon it of low forms of plants known as wood-destroying fungi and bacteria. The germs of decay are not inherent in timber; infection must come from outside, and sound wood becomes infected by contact with either tissue or spores of a wood-destroying fungus under suitable conditions of temperature, moisture and air supply. In the particular case noted the range of temperature and relative humidity of the air in the factory were such as to provide exceedingly favourable conditions for the growth of several o the most destructive kinds of fungi, and in addition the unseasoned state of the timber facilitated decay. The moisture factor, it is pointed out, is especially important, for if the required amount of moisture is present in the wood the fungi can grow. The subject is of special importance in this country at the present, when so much timber construction is proceeding for war purposes, and its importance will be equally great, if not greater, under post-war building requirements. A preservative for the treatment of timber which has been in general use in Canada and America is mercuric chloride (corrosive sublimite), and other less costly materials which might be used are zinc chloride and sodium fluoride. Emphasis is laid upon the proposition that where the operations carried on create very favourable conditions for the growth of fungi, the use of untreated timber, especially timber of low density, or timber containing much sapwood, is inviting disaster.

* * * *

National Salvage.

Before the war brought the people of this country to a sharp realisation of the necessity of relying on their own resources instead of depending on imports from foreign countries, their efforts in the direction of waste utilisation were practically negligible. Now, however, this is all changed, and the creation of a Directorate of National Salvage affords visible evidence of the importance which the question has assumed. It is not surprising, therefore, that the subject of salvage should have occupied the attention of the recent annual conference of the Institute of Cleansing Superintendents to the exclusion of all other matters. The meeting, which was held at Stockport under the presidency of Mr. Eccles, the cleansing superintendent of that town, was attended by Mr. David Currie, the Director of National Salvage, and by Mr Dawes and Mr. Priestley, technical advisers to the department. The first-named gentleman laid great insistence on the fact that the primary object of the salvage campaign is to economise in tonnage. It follows from this, of course, that local authorities ought not to consider too closely the possibility of profit in connection with the inauguration of

a scheme, although, judging by the prices that can now be obtained from salved materials, it would seem at least that with good management no loss ought to be incurred. Those who are seeking information with a view to taking part in this urgent national work can hardly do better than examine what has already been accomplished in Liverpool, a city which has for a very considerable time devoted great attention to the subject of waste utilisation, with very satisfactory results. For example, fish and abbatoir offals are sterilised, and, after the extraction of oil and grease, the residue is dried and ground into a meal for feeding pigs and poultry and sells at £25 per ton. Other matters that are dealt with separately and turned into sources of revenue include waste paper, bones, rags, oyster shells and tins. The importance of salvage operations is well illustrated by the example of Germany, whose efficiency in this direction is well known. For example, in Berlin alone over 4,000 kilos of fat are obtained daily from plate washing, which is systematically carried out according to official instructions. If our salvage arrangements can be brought to the same standard as that of the enemy a considerable stride will have been made towards victory.

Our attention has been called to an error in our note of last week on the subject of the Weston-super-Mare extraordinary traffic case. In line 20 instead of saying the learned judge answered both questions in the affirmative, we should have said he answered the first question in the affirmative and the second question in the negative.

ROAD MAINTENANCE IN WORCESTERSHIRE.

COUNTY SURVEYOR'S REPORT.

In his report on the main roads and bridges of Worcestershire for the year ended March 31st last, Mr. C. F. Gettings, M.INST.C.E., the county surveyor, states that the expenditure during that period was £49,886, which was considerably less than the amount provided in the estimate. The average nett cost for the maintenance of roads, excluding improvements, tar-painting bridges, miscellaneous, contingencies and urbans, was £44 11s. 3d.

The cause of the unexpended balance was similar to the previous year, only that it was accentuated by a further reduction in labour, "and the effect," says Mr. Gettings, "can readily be seen by anyone who has made a close observation of the roads not dealt with during the past three or four years. While it is a fact that there were considerable stocks of material in certain parts of the county, they were more or less concentrated on a few roads on which it was impossible to provide the labour. In some cases the material has been deposited on the side of the road for upwards of three years, and it is unfortunate to be compelled to watch a road seriously deteriorating while material is ready at hand. At the same time on many of the roads where the heaviest traffic is taking place there is not any material in stock."

Mr. Gettings reiterates what he has referred to in previous reports, that the time will soon arrive when nothing but reconstruction will meet the case, and hopes that the council will continue the policy commenced last year in placing a further sum on one side in order to create a reserve to assist the very heavy demands that will be made at the termination of the war.

WAR PRISONERS AS ROAD MAKERS.

In consequence of the further depletion of staff in the early part of the year, the War Office was approached on the question of releasing a certain number of German prisoners for work on the roads. After considerable negotiation, the War Office agreed to release a number of prisoners from some of the labour and agricultural camps in the county. The labour was selected as far as possible from men who had previously had a certain amount of experience in manual work, and although the average standard was not equal to that employed on the county council's staff, after a few weeks of instruction, Mr. Gettings was able to get a fair percentage of men who were capable of doing very useful work; in fact, had it not been for this labour certain work would have been brought to a standstill in various parts of the county, and for the duration of hostilities the county surveyor hopes the War Office will agree to continue the practice of releasing labour for road work as far as practicable.

TIMBER AND MUNITION TRAFFIC.

The traffic in connection with the removal of timber from a number of rural areas in the county increased abnormally during the past year, and in many cases the traffic has been put on roads which hitherto have been of secondary importance, and in consequence have not received the same attention as some of the more important roads.

The traffic in connection with munitions, particularly in the northern part of the county, has increased abnormally. This can be seen more especially by the enormous increase in motor lorries that have been put on the roads, and in the majority of cases they are passing over the more important roads, so that it is difficult to assess the damage. Fortunately, a number of these roads were reconstructed immediately prior to the war, and they have withstood the strain splendidly.

STEAM LORRIES.

In consequence of the increasing difficulties experienced in obtaining necessary transport, it was decided to purchase two additional steam lorries. Although the conditions are far from normal, Mr. Gettings regards it as quite certain that this procedure led to a considerable reduction in expenditure. Careful records of the costs of working are being kept, but it is not considered advisable to publish them under present conditions owing to the abnormal prices that are now in operation.

TAR-PAINTING.

About 130 miles of main roads, exclusive of borough and urban areas, were tar-painted at a cost of £7,346. In this connection Mr. Gettings remarks, "Had it not been for the fact that we have continued to increase the mileage each year since this work was commenced in 1912, many of our more important roads would have been in a deplorable condition to-day."

ROADS IN BOROUGH AND URBAN AREAS.

The roads in the borough and urban areas have generally been maintained in a satisfactory condition, so far as the materials allocated would permit. The depreciation is not so perceptible on many of the roads, because of the fact that a larger percentage of material has been applied in former years and the surfaces tar-painted; but if the time of repair is extended, Mr. Gettings fears that many of them will require considerable attention. He adds, "When it is found possible to deal with the more important roads, and the traffic justifies it, I should not hesitate to advise that bituminous-bound material be substituted for the ordinary macadam, as being the more economical method of treatment."

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

THE MINER'S BATH.

To the Editor of The Surveyor.

Sir,—In your report of the proceedings of a meeting of the Institution of Municipal Engineers, held at Oxted, Mr. A. E. Strickland, of Windsor, is stated to have said: "Those who have lived in the North of England knew that the miner did not wash in his home; his wife washed him outside the door in the street. Nine out of every ten of the pitmen of Northumberland and Durham in the small colliery districts were washed outside their front doors. There was no shame among the men and women, because it was a custom that had been long in vogue."

Was Mr. Strickland "pulling the leg" of his audience, or has someone been pulling Mr. Strickland's leg? As surveyor for a period of fifteen years in a mining district in the centre of the Northumberland coalfield, I have not once during that time seen a miner bathe in the street. He is generally found bathing in a large bath-tin in front of his kitchen fire, which is scarcely such a public place as the street.

Mr. Strickland suggests public baths for miners. These would prove "white elephants"; the miner prefers the privacy of his own home for the performance of his ablutions.

If all Southern ideas concerning the customs of the North are so erroneous as those contained in the above quoted speech, it is highly desirable that the North should be strongly represented at meetings at Whitehall or elsewhere where by-laws, &c., are drafted.—Yours, &c.,

Wm. J. Coulson.

August 26, 1918.

Councillors and Salaries.—In the course of a discussion at Warrington Town Council on a proposal to increase the salary of the water engineer, Mr. Gray, by £50 a year, Councillor Gough objected on the ground that the work of the engineer was an easy job, and he had very little to do. Another councillor said he did not think the present was the time for giving continual increases. Councillor Bradshaw spoke in support of the minutes. He did not view the proposed increase from the point of view of Councillor Gough, who uttered a lot of empty-headed sarcasm and then put forward no facts in support of what he said. It was all bunkum and nonsense for anyone to say that Mr. Gray had nothing to do. He was one of the smartest water engineers in the country, and one of whom the corporation should be proud. Councillor Lindley agreed that in Mr. Gray the corporation had a very able engineer at a low salary. He had been working during the whole of the war without a deputy and with a depleted clerical staff. The proposition was eventually agreed to with three dissentients.

Possibilities of Salvage and Utilisation of Waste.

By DAVID CURRIE, Director-General of National Salvage.

[Address delivered at Annual Conference of Institute of Cleansing Superintendents at Stockport.]

I think we have all come to realise in these days what a wasteful nation we have been—how prodigal with our resources! The reason for this is perhaps not far to seek. The bulk of the world's raw materials were at our disposal; we had the money to purchase them and the ships to bring them to our shores; it was far less trouble to use new material than to bother about the old, which was accordingly either thoughtlessly consigned to the scrap heap or ruthlessly destroyed.

We are, I think, naturally an improvident people, and we forgot the first great principle of Nature—viz., that matter is indestructible and, properly manipulated, can be used again and again. We invented the word "rubbish" to describe not what was useless, but what we were too indolent to collect and prepare for further use, and thus introduced waste—a word which only has a meaning when the material wasted is of some intrinsic value. We cannot waste what is of no value, and therefore by the expression utilisation of waste we mean the utilisation of material which is of potential value, but which is at present being wasted either by destruction or neglect. The truth of the old saying, "Waste not, want not," is now coming home to us, and we are beginning to realise what an important part salvage can play in helping to win the war, and how still more important it will be in those anxious days of reconstruction which will follow when every scrap of raw material will be required, not only for our own needs, but for the needs of those bruised and battered countries where the monstrous ambitions of the German Apollyon have wrought such rack and ruin.

AN URGENT NATIONAL NEED.

For years and years, gentlemen, the energies of most European nations will be devoted to salvage in its widest sense, and while the wreckage and waste of war is being cleared away every scrap of material which can be salved will be invaluable, while in the industrial struggle which is bound to come the possession of raw material will undoubtedly prove the dominating factor. Salvage, therefore, is to us as to all other countries an urgent national need, and we must set ourselves with all our hearts and souls to master a subject which has been so carelessly—one might almost say criminally—neglected in the past.

We have only to look around us to realise at once what ample opportunities there are in every direction for organised salvage in this country, and not the least important of these directions is that in which you, gentlemen, are most interested—viz., municipal salvage. I will not stop now to inquire whether this form of salvage pays or not. I am advised that it can be made to pay, and the experience of some local authorities certainly shows that this is so; but at the moment this seems to be a question of secondary importance; and even if salvage is to be carried on at a temporary financial loss carried on it must be, for above everything else at the present time we need the commodities which can be salved and the tonnage which can be freed, and our necessity for these things is so great that they must be obtained even if the result should be a debit instead of a credit balance.

In the United States of America salvage is being energetically taken up by the Food Administration. The United States Food Administrator has pointed out recently that twenty-four cities of over 100,000 inhabitants are not utilising garbage and are therefore wasting the equivalent of 4,400,000 lb. of nitroglycerine and 40,000,000 12-oz. cakes of soap besides enough fertiliser to produce a 3,000,000-bushel wheat crop. Twenty-nine other cities, on the other hand, are saving products worth over $11,000,000 per annum, and that a large percentage of these products are being directly used by the Government for munition making; but even in these cities there is still being wasted sufficient grease to produce enough nitroglycerine to furnish the powder charge for about 2,000,000 shells of the famous "75's." Three hundred cities of over 10,000 are disposing of their garbage for pig food, and the estimated yield of pork should be 100,000,000 lb.; but owing to bad methods of separation it is actually only 50,000,000 lb., worth $8,000,000. On the other hand, 350 cities are not using their garbage and are thus losing 60,000,000 lb. of pig food annually.

What is France doing? I have seen a report within the last few weeks on the Possible Salvage from Household Waste in Paris. We all know that the Paris "rag-picker" had an European reputation, and he still seems to live up to it, for this report states that with the exception of certain vegetable matter, "nothing escapes from the sorting of a multitude of men, who recover everything that commercial ingenuity enables one to utilise. The intervention of these men begins from the time of the throwing into the streets and is continued up to the incinerator." The problem in Paris thus narrows itself down, says the writer of the report, to the salvage of vegetable waste. So much for our gallant Allies.

Let us turn to a neutral country. In Switzerland the Department of Economics issued in June this year special instructions for the collection of kitchen and garden refuse. The speculative and uncontrolled collection of refuse will be strictly prohibited.

GERMAN METHODS.

And how about the enemy? Prof. Stephen Leacock, who is the American Lewis Carroll, recently wrote a book in which he described a dream that he was in Germany. In one passage he says: "There were two peasants working beside the road. One was picking up fallen leaves and putting them into neat packets of fifty. The other was cutting off the tops of the late thistles that still stand unwithered in the chill winter air and arranging them according to size and colour. In Germany nothing is lost—nothing is wasted. It is perhaps not generally known that from the top of the thistle the Germans obtain picrate of ammonia, the most deadly explosive known to modern chemistry, while from the bulb below, butter, crude rubber and sweet cider are extracted in large quantities."

This, of course, is a jester's dream, but it is not so very far removed from the grim reality of the waking truth. Although Germany is not putting up her leaves in packets of fifty, it is reported that she is using dried beech leaves as a substitute for tobacco; although she is not using thistledown she is cultivating nettles to obtain textile fibres.

Let us stop for a moment and ask ourselves, "How is it that the Hun, who has been for nearly four years totally—or at least partially—blockaded, who is surrounded by starving peoples, who has cast all his resources, human and material, unreservedly into the business of war, is still able to carry on with vast armies apparently as well equipped as our own, with all the world's markets open to us from which to draw our raw material, and with half the world's factories working overtime on our behalf?

Take the case of clothing, for example. Germany's own production of wool and that of her neighbours is not nearly sufficient for her needs, and possibly of all materials this is one against the import of which Germany has been most effectively blockaded, and yet her armies in the field are nearly, if not quite, as well clad as our own. Quite early in the war optimists predicted that Germany must soon run short of this, that or the other essential, but she is still fighting apparently strong, boastful, and well-equipped as ever. How is it done? By salvage in its widest senses—organised salvage, carefully planned and developed for years as part of her preparations for war.

As the following notes will show, the German is a past master in this science, to which we are only beginning to turn our attention.

In each village in Germany the chief magistrate has the duty to see that the inhabitants of the village bring all their waste material to the official collecting centre; the time at which this has to be done is announced by placards every month or half-month. Every head of a family or head of a household is bound (under pain of punishment) to see that nothing is wasted; everything that seems useless must be collected. The waste material of greatest value is metal—useless cooking utensils of all kinds of metals, worn-out tools and other workmen's implements, ribbons, wire, nails, &c. Among the country people the waste material from the kitchen is used for feeding the animals. The population of the town has, on the contrary, to give up every kind of waste from the kitchen daily. For instance, it is obligatory to remove the grease from plates and dishes by heating them and washing it off with a very little water, which is then collected in pails. Statistics showed that in Berlin 4,000 to 5,000 kilos of fat were obtained daily from the collection of rinsing water (in the town alone). This fat is used for lubricating grease and for the manufacture of soaps.

The skins of all kinds of small animals (hares, rabbits, &c.), every kind of hair, feathers, &c., must all be collected. In the larger towns carts and motors have been organised for this purpose, and these go round to each house every day in the morning at a fixed hour, at which time the inhabitants must bring the waste material down and empty it into the carts. In Berlin and the other big towns the whole business must be finished before 7 a.m.

As the slaughtering is under State control, and takes place in the bigger towns only in big slaughter-houses, special appli-

ances have been invented which catch all the waste, such as blood, hair, &c. The rare home slaughtering which takes place in the country is also under the supervision of the magistrate, and here also all the waste must be collected.

Special arrangements have been made for transporting the corpses of animals which have died of disease to special factories, where they are immediately put into use. The work is done without any smell, as the whole apparatus is hermetically closed. A whole body can be thrown into the dissolving oven. Fat is obtained first of all by this process; then gelatine (glue), and other stuffs which are used in various branches of industry. There is another apparatus which concentrates and utilises the gases of putrefaction. The remainder of the corpses is used for chemical manures.

In order to obtain oil, all the pips and kernels of fruit, especially peaches, plums, and apricots, are collected—and also the pips of apples and pears. The school-children are particularly used for such collections. Not a kernel or a pip may be thrown away. The official collectors have had advertisements put up in all public buildings, restaurants, stations, &c., to the effect that everyone is to collect the stones and pips, and is to bring them to the collecting centres, mostly instituted in the schools or in the municipal buildings. The school-children are used also to collect acorns and beech nuts; beech nuts make very good salad oil. The collecting centres at Stuttgart published a report in 1917, according to which 150,000 kilos of oil had been extracted from the fruit kernels, acorns, horse chestnuts, and beech nuts collected by the school-children.

POSSIBILITIES OF MUNICIPAL SALVAGE.

Let us now return to the question of our own salvage, particularly municipal salvage.

The subject is a very large one, and may be dealt with under three heads: (1) What kind of material and what quantity is at present being wasted? (2) How can it best be salved? and (3) How best utilised?

It would be impossible for me, even if I were able to do so, to deal fully with each of these branches of our subject, and I propose to deal only with the first, leaving the second and third to those who have actually been doing them, who therefore know the difficulties and the possibilities from actual experience, and are far more competent than I am to deal practically with the problems of collection and utilisation.

I propose, gentlemen, to confine myself to what I shall call the Possibilities of Municipal Salvage.

The quantity of refuse which is "made" annually throughout the country I have estimated at 9,450,000 tons. This figure is based on an allowance of 15 cwts. per 1,000 of the population during 300 days in the year, a figure which is I think below the average of the amounts actually collected in most parts of the country. Whether we are justified in applying a figure obtained from the records of towns and cities to the country generally is a matter I shall deal with later, but I would just remind you here that it is the make of refuse which we are at present considering, and not its collection, and there is no apparent reason why the make of refuse should be any less in rural districts than in urban areas.

And now as to the nature and composition of this refuse. This I have based on actual results obtained by the authorities of Accrington, Bury, Hackney and Sheffield, each of whom have had a careful analysis made of bulk lots of ordinary refuse such as would have in due course been passed through the destructor. The following table shows the average results, and what they represent if applied to the refuse of the country generally:—

ANALYSIS OF "REFUSE."

Commodity.	Analysis of refuse in Sheffield, Accrington, Hackney and Bury.	Applied to population Great Britain, assuming 15 cwt. per 1,000 population per day during 300 days annually = 9,450,000 tons.
	Average Percentage	
Fine dust	50·98	4,817,610 say 4,800,000 tons
Cinders	39·63	3,745,035 ,, 3,700,000 ,,
Bricks, pots, shales, &c.	5·35	505,575 ,, 500,000 ,,
Tins	0·98	92,610 ,, 90,000 ,,
Rags	0·40	37,800 ,, 37,000 ,,
Glass	0·61	57,645 ,, 50,000 ,,
Bones	0·05	4,725 ,, 4,000 ,,
Vegetable matter	0·72	68,040 ,, 68,000 ,,
Scrap iron	0·06	5,670 ,, 5,000 ,,
Shells	0·08	7,560 ,, 7,000 ,,
Paper	0·62	58,590 ,, 58,000 ,,

These figures may appear to be somewhat fantastic, but I can assure you, gentlemen, that they are founded on facts and are within the bounds of reasonable possibility. Some of you may perhaps say, "The conditions in these towns or cities must be most unusual. I am sure that my refuse is nothing like so valuable." Well, gentlemen, I can only advise you to go back home and make sure. Our first test was made in Sheffield, and the results surprised us, but when the results of the other three came in they all bore out the Sheffield figures. I may say further that several other authorities who have since at our request analysed their refuse have obtained in every case at least similar and in some cases even higher results.

[Mr. Currie next proceeded to inquire what shipping tonnage would be freed by the complete salvage of such materials as are at present being imported into this country.]

The figures which I have quoted must not be taken too literally, and we might not be justified in applying the possible ascertained salvage from the refuse of four large towns to the country as a whole, including all the small urban and rural districts from which one cannot hope to attain anything like the same results in the way of salvage work. This is no doubt true, but I am quite sure that far more can be achieved in such small urban and in rural districts than has been done in the past, if only combined efforts are made in the direction. Further, as a set-off against this consideration, we may put the fact that the analyses on which we have based our figures were made of refuse from which in some cases a certain quantity of paper, rags, &c., had already been extracted by special collections.

As comparatively few local authorities as yet collect separately, or sort their refuse before destruction or tipping, our percentages for paper and rags at least is probably too low. I am inclined to think, therefore, that the figures I have given are within the mark as indicating the quantity of valuable materials at present being wasted, and if that is the case, they are the measure of the results which would be attained by complete salvage. This, of course, is too much to hope for under present conditions, but there is no harm in accepting the figures as ideals after which it is well worth striving with all the earnestness and energy at our disposal, and I shall have failed in my address to you to-day unless I have brought home to your minds, not only the possibilities, but the far-reaching results which can be obtained by combined and concentrated efforts in this direction. I am quite aware that all of you have many other duties of the utmost importance to perform, and that each one of you is probably doing double duty in some form or another. Nor do I forget the difficulties both as regards transport and labour with which your work is surrounded, but salvage work is necessary, and there are no others better placed or more competent to deal with its problems than the members of your institute.

RECENT PUBLICATIONS.*

Mensuration made easy; or, The Decimal System for the Million. By C. Hoare. Price 1s. nett. London: Effingham Wilson.

This little book has been written with the object of popularising the use of decimal methods of calculation by the artisan classes. An elementary exposition of the rules for manipulating decimals is followed by an explanation of the ordinary processes of mensuration, the calculations of course being all on the decimal system. Part IV., which deals with practical applications, should do much to arouse and sustain the interest of those artisans into whose hands the book may come.

Aquatic Microscopy for Beginners, or Common Objects from the Ponds and Ditches. By Dr. Alfred C. Stokes (fourth edition, revised and enlarged). Price $2.25 nett. New York: John Wiley & Sons.

Engineers who have made a study of microscopic organisms in water will remember with pleasure Dr. Stokes' elementary book on aquatic microscopy. For some years this has been out of print, but it has recently been revised and enlarged, and issued by a new publisher, Messrs. John Wiley & Sons, Inc. In bringing this book back to life the publishers have done well, for, although it is an elementary book, it is a most useful one. It is not as exhaustive a treatise as Ward and Whipple's "Fresh-water Biology," but in an elementary way it covers almost the same ground. It treats not only of the various forms of algæ and protozoa, but the aquatic worms, crustacea, and some of the higher forms of animal and vegetable life. There is, moreover, a key to each group of organisms, which the beginner will find very useful. The book in its new form is much better than the original edition. The plates are the same as before.

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*Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

Institute of Cleansing Superintendents.

ANNUAL CONFERENCE AT STOCKPORT.

There was a large and representative gathering at the annual meeting of the Institute of Cleansing Superintendents, held in the Town Hall, Stockport, on Tuesday, August 20th. Mr. W. H. Eccles, the president-elect, presided over the conference after Mr. Terry, the retiring president, had vacated the chair. Among those present were His Worship the Mayor of Stockport (Councillor T. Rowbotham, J.P.), Mr. D. Currie (Director-General of National Salvage), Mr. J. C. Dawes and Mr. J. A. Priestley (technical advisers to the National Salvage Council), Mr. J. Terry (hon. treasurer), Mr. T. B. Crookes (hon. secretary and hon. editor of the *Cleansing Superintendent*), A. Findley (Aberdeen), R. Diggle (Accrington), J. Marginson (Blackburn), F. Smith (Bolton), T. H. Turner (Bury), T. Robinson (Bolton-upon-Dearne), J. C. Blake (Cheshire), Jno. Duncan (Dundee), C. W. Laskey (Eccles), J. Gibson (Edinburgh), T. D. Tolliday (Exeter), T. McKee (Falkirk), W. Greig and C. H. Macfarlane (Glasgow), Jas. Devine (Greenock), W. J. Downey (Huddersfield), A. G. Jeffries (Hampstead), T. Horrocks (Hyde), J. H. Brocklehurst (Horwich), J. C. Dawes (Keighley), G. Walsh (Kearsley), D. Kennedy (Kensington), S. Thornley (Leeds), W. J. Heavey (City of London), J. J. Beckett (Liverpool), — Nisbet (Local Government Board), — Moss (Macclesfield), R. Williamson (Manchester), G. H. Anderson (Middlesbrough), J. T. Nutter (Nelson), J. F. Morgan and J. Dudgson (Newcastle-on-Tyne), Jos. Brocks (Norwich), J. Terry (Nottingham), J. L. Haslop (Oldham), A. Ashworth (Oswaldtwistle), H. Hopkinson (Portsmouth), W. Weir (Rutherglen), F. W. Brookman and C. Boden (Rochdale), E. Nuttall (Stretford), W. H. Hamblett (Salford), R. Heath and T. J. Williams (Swansea), Jas. Atkinson and W. H. Eccles (Stockport), T. H. Whitewick (Surbiton), J. A. Priestley and E. Hobson (Sheffield), R. H. Storer (Tynemouth), H. C. Bascomb (Wallasey), R. Cleworth (Widnes), H. Cousins (Wolverhampton), R. B. Donald and E. Knowles (Wigan), and J. T. Price (Woolwich).

The Mayor of Stockport, who presided over the opening proceedings, gave a hearty welcome to the members of the conference. The work they were particularly interested in—the work of cleansing the town—was of immense importance, and he thought no department of the Stockport Corporation was better managed than the cleansing department. They had profound respect for their cleansing superintendent and also for Mr. Clarke, the chairman of the Cleansing Committee, under the supervision of whom the work went on very smoothly. His Worship congratulated the institute and also Mr. Eccles on his appointment as president of the conference.

Councillor J. Barrodale (vice-chairman of the Cleansing Committee) said that in Mr. Eccles they had one of those men who could not be beaten whatever he took in hand.

Mr. John Terry, retiring president, on behalf of the institute thanked the mayor and committee for the very splendid welcome given to them. They had decided to meet on neutral ground and elect Mr. Eccles, one of the oldest members of the institute, to the position as president. When the Stockport Cleansing Committee heard that their superintendent was to be elected president they were told they must come to Stockport. Whatever difficulties there may have been they were surmounted, and the magnificent town hall had been placed at their disposal and they were also being hospitably entertained. He hoped the conference would be of advantage to them and also to the town. Actions spoke louder than words, and Mr. Eccles was a man of action and was held in the highest esteem. Mr. Terry again thanked the mayor and committee for their hearty welcome. He had now a very pleasing duty to perform, and in another respect a rather sad one—"to instal Mr. Eccles into the chair I now occupy, but in taking leave of you I shall (said Mr. Terry) continue to be an active member of the institute." Although Mr. Eccles did not represent one of the largest cities he certainly represented one of the most progressive boroughs in the country. He believed Mr. Eccles was one of the oldest members of the institute, in which he took a keen interest, and had not previously been their president. That had been Mr. Eccles' misfortune, but the opportunity had now come, and to-day he was receiving the honour so well and worthily earned. Mr. Terry then presented Mr. Eccles with the presidential medal, remarking that he had the best wishes of every member of the institute for a successful year of office.

PRESIDENT'S ADDRESS.

On taking the chair vacated by Mr. Terry, Mr. Eccles said:

The present circumstances are such that we have to still do our utmost to "carry on." Cleansing superintendents have never had to face such acute difficulties as at the present time, owing chiefly to depleted staffs, and the demands which are being made for the salving of various articles from the refuse collected. The military authorities are still calling for more men, notwithstanding the earnest representations which have been made to the authorities during the past two years. No work is more important or more essential than the regular and systematic removal of refuse, the neglect of which has always been a menace to the health and well-being of our people. This fact, therefore, constrains us to put into our work the grit and determination which is required of us, and we might well apply the old biblical teaching which sayeth, "Whatsoever thy hand findeth to do, do it with all thy might." We have therefore seriously to consider how we can best "carry on." The question which naturally presents itself is, How to remove a greater quantity of refuse, and the most expeditious manner of disposal.

MECHANICALLY-PROPELLED VEHICLES.

This, then, I think obviously brings us to the consideration of the mechanically-propelled vehicle *versus* the horse-drawn vehicle, and considering the present high prices of horses, horse foods, and the high cost of labour, there is perhaps more to be said in favour of the mechanical vehicle than at any other time. It is for each district to determine the class of vehicle most suited to its needs and conditions of working. Stockport has not developed motor traction to any great extent, but the successful working of our motor sweeper is most encouraging to all concerned.

Another main feature of our meeting to-day is the salving of articles from the refuse, which not only means a source of income to a cleansing committee, but is of considerable value and assistance to the nation's welfare. As exigencies arise and time progresses, the position of the cleansing superintendent will be looked upon with much more favour than has been the case in the past. The calling in by the Salvage Council of our honoured colleagues—viz., Messrs. Dawes, Priestley and Crookes, and, later, Messrs. Diggle, Jackson, Terry, Gibson and Greig—as district advisers to the National Council, all goes to show the abilities of our members are being better recognised; and if a Health Ministry is established I sincerely hope that the status of the cleansing superintendent will not be overlooked.

VALUE OF MEETINGS.

We are now in the twenty-first year of our association's existence, the formation of which took place at the Manchester Town Hall on June 25, 1898. I therefore feel proud indeed to have the honour of being president during the year which the institute will attain its majority. I am positively convinced that the improved conditions in the working of cleansing departments is the result of the meeting together of municipal representatives with their superintendents. The exchange of ideas and mutual intercourse has been the means of bringing into effect many things which had only been thought about. For the want of courage or inexperience these thoughts had not materialised until encouraged by papers read on various subjects, discussion thereon, or the encouragement given by some of our esteemed colleagues whose generous advice could be safely followed.

TRIBUTE TO SECRETARY.

In conclusion I should like to pay a tribute to our very worthy secretary and honorary editor. It is undoubtedly agreed that he does the work of the institute in a most painstaking and creditable manner. The production of the journal has been very considerably improved, and I venture to appeal most earnestly to all present to assist the editor by submitting matters of interest for insertion in the journal which may be of benefit not only to members and associates but to members of councils and committees.

I also desire to express my heartiest thanks to Mr. Terry for his kind words and good wishes, knowing full well that I shall have his support and sympathy in fulfilling the duties of this important office. I feel deeply indebted to members of the council for the unanimous support given to my nomination, and I sincerely hope that I may be able during the year to fulfil the duties devolving upon me to the benefit and satisfaction of the institute, and that I may be able at the end of my term to hand over the authority of the office unsullied and untarnished and to show some steps of progress. I sincerely hope that our meeting here may prove to be of considerable and valuable interest to all present, and although the principal subjects of our deliberations will be on so-called "wastes," may we truly realise that our time has not been wasted.

After the presidential address Mr. Eccles called upon Mr. David Currie, the Director-General of National Salvage, to read a paper on "Possibilities of Salvage and Utilisation of Waste."* An address by Mr. J. C. Dawes, technical adviser to the National Salvage Council, on the subject of "Municipal Salvage," followed, an interesting discussion—which will be fully reported in a future issue—ensuing.

* See p. 99.

Institution of Municipal and County Engineers.

TWO DAYS MEETING AT ABERGAVENNY.—(*Conclusion.*)

A short discussion followed the presentation at the recent meeting of the Institution of Municipal and County Engineers at Abergavenny of the paper by Mr. Frank Mansfield, the borough surveyor—reproduced in our issue of last week—on

ABERGAVENNY: ITS MUNICIPAL WORKS AND UNDERTAKINGS.

Mr. D. M. Jenkins (Neath) moved a vote of thanks to Mr. Mansfield for the paper. He was much impressed by the complete list of public works which the town possessed. It showed a very high public spirit. On the question of main roads, Mr. Mansfield said the county council grant had been increased by £100 per mile. That seemed to him a low figure. If the roads in question were subject to motor-'bus traffic, then he thought the council were very economical in their expenditure. He had had some experience of motor-'bus traffic on main roads, and their costs were very much more than £200 per mile. With reference to the sewage disposal scheme, it was a singular thing to find the land held on lease. He supposed the only terms obtainable were that the council had to take a lease. As a general rule, it did not seem a very healthy thing, but of course one knew it was not always wise to seek compulsory powers where they had a local landowner interested in a place. Mr. Mansfield had stated that the dry-weather flow was from 250,000 to 300,000 gallons a day. That seemed to be a very high figure, and there might be exceptional circumstances to account for it. With reference to the treatment of the asylum sewage, the terms were certainly very reasonable. As to the water supply, the point as to compensation water was very interesting. The usual provision was a proportion of the rainfall on the watershed. It struck him that the provision of 7½ million gallons of storage for a population of 8,000 was very low, but one could not criticise the figure because one had not the information as to the flow of the springs. The springs undoubtedly were pretty good, and the flow considerable, which accounted for the relative lowness of the storage.

Mr. J. Parker (Hereford) seconded the vote of thanks, and remarked that both the water supply and drainage of the town were first-class. The price of the land for the housing scheme was exceedingly reasonable.

Mr. Dan H. Price (Bedworth) said the paper led him to the conclusion that Abergavenny, though an ancient town, was very progressive. It was not often that they found a small town has its own water and gas supplies and other utility works. It struck him that the allowance for main roads was small, but he could assure the meeting that the payment was large compared with the industrial districts of Monmouthshire. In Sirhowy Valley the allowance was only £70 per mile, and for the main road in the Rhymney Valley the county council paid £50 per mile.

Mr. E. Watkin Edwards (Mynyddislwyn) congratulated Abergavenny on possessing all public utility services, and he wished his own district was as well provided in this respect. He wished to ask whether the gasworks were self-supporting, and congratulated them upon the large amount of loans repaid, which put the town in a favourable position. In his district they paid £10,000 for the goodwill of a gasworks to supply 5,000 people. He also congratulated Abergavenny upon the payment to main roads. Mr. Jenkins seemed to think it inadequate, but he could assure him the Monmouth County Council took a lot of convincing. In the Sirhowy Valley they only received £70 per mile for a road which carried the heaviest traffic in the neighbourhood.

Mr. A. Dryland (Surrey) asked whether these were main roads for which the county council was bound to contribute or whether they were roads for which there was merely a grant. If they were main roads, they had the power to get a fair amount allowed to them by appealing to the Local Government Board. In Surrey they did not act upon the principle of keeping down the county rate at the expense of the local authorities. As to roads, a good deal depended upon the cost of material, and he should not think it an unreasonable amount for this neighbourhood having regard to the cost of material.

Mr. T. F. Harvey (Merthyr Tydvil) mentioned that fifty-two years ago he was living at Abergavenny. At that time he was assistant engineer on the London and North Western Railway. The paper compressed a lot of information into a small compass. As to the water supply, the quality was agreeable, and, like all the Welsh mountain water, was soft, coming as it did from the red sandstone. The reservoir was small, containing 7½ million gallons, but a large portion of the water supply came from the springs. The reservoir they were constructing at Merthyr would contain 3,300,000,000 gallons. He should take it they were using 30 gallons of water per head per day in Abergavenny, otherwise their dry-weather flow of sewage would not be as large as it was. In Merthyr they were extravagant with water, using up to 40 gallons per head per day. The fact was that Merthyr had been amply supplied for three generations and they had learnt to be extravagant. The water-closet system made a great difference, many places which formerly used 15 gallons per day going up to 25 gallons. That and baths, accounted for a great part of the increase, and he thought it a good sign of the times.

Mr. F. Hatcher (Porthcawl) thought they were extremely fortunate to obtain land for town planning and housing at so low a figure, and the site was an ideal one. In his own district the price of land had gone up tremendously, and they were now asking £1,250 an acre.

Mr. Marlow Reed (Middlesex County Council) said with reference to housing and town planning, it would be found allotments were expected to be provided, probably in many places outside the twelve houses per acre.

Mr. G. S. Morgan (Pontypridd) said as to the towns in which water could be taken, it would be interesting to know whether this was because of millowners' rights in the gathering grounds. The capacity of the reservoir was entirely out of proportion to the yield of the gathering ground, but he presumed it met all the needs of the town, and they were content so long as they got a full supply for the inhabitants. The consumption of water for baths and flushing cisterns was perfectly legitimate, but he could not help thinking, if the consumption was 40 gallons or even 30 gallons per head, there must be a large amount of waste. With properly kept works he could not help thinking that 20 gallons per head per day ample for the domestic supply. There was a feeling among local authorities that they did not want to have a lot of officials going about, but if they put in waste meters, they must still have men going about to locate the leakages which took place. They could not do it one year and drop it another year; it must go on from year to year. If local authorities were shown that it was necessary to keep down the waste of water, it would be advantageous all round.

Mr. W. E. Lowe (Pontypridd) congratulated the corporation on their progressiveness in controlling most of the works of public utility. He believed allotments had come to stay, and he understood they were likely to have the period of occupation extended to two years after the war. The difficulty was that many of them had water laid on the most eligible building plots. He felt they would have to be disturbed and put to the inconvenience of going further out.

Mr. F. Wilkinson (Deptford) did not think the loss on the abattoirs was great; what he did deplore with all the abattoirs was the lack of cold storage. This lack of cold storage had caused a good deal of food to be destroyed. With regard to sewage disposal, he was glad to see broad irrigation had been adopted. At Wimbledon, where they had broad irrigation, they were able to get tremendous income from their crops.

Mr. A. P. I. Cotterell (Westminster) said there was no doubt the town was to be congratulated upon its water supply, the gathering ground being an exceptional one. The dry-weather flow of sewage was given as from 255,000 to 300,000 gallons per day. If that was so the water consumption came out at about 35 gallons per head per day, a somewhat large figure for a country town. He was not one of those who hoped to see the water consumption cut down to a low figure. He believed, with the provision of baths, they were bound to have it up to 20 gallons per day for domestic consumption. He noticed that the level of the lowest part of the gathering ground was about 900 ft. above Ordnance Datum, and the town itself generally at a level of 200 ft. above Ordnance Datum, a difference of some 700 ft. A little time ago he was in the town of Las Palmas in the Canary Islands, where an English firm was carrying out the water supply, and combined with the water supply was an electric light scheme. The head of water there was being used to drive turbines and electrically light the town. He was not prepared to say whether such a scheme was possible in Abergavenny, but he took it that there was 20 h.p. going to waste on a supply of 300,000 gallons a day. That was not an inconsiderable amount of power. This country only used 8 per cent of the available water power, whereas Germany used 43 per cent.

Mr. Mansfield, in reply, said he was extremely grateful for the kind reception they had given to his paper.

The members were entertained to tea at the Castle grounds, after which there was a bowling match between sides representing the town and the institution.

On the following day a visit of inspection was made to the service reservoir and to the springs.

Fertiliser Value of Sludge.

By Colonel GEO. G. NASMITH, C.M.G., D.SC., Director of Laboratories, and G. P. McKAY, B.A., Chemist in Charge of Experimental Sewage and Chlorination Plant, Department of Health, Toronto.*

The most important problem remaining to be solved in the disposal of sewage is probably that of economically dewatering the sludge. Since the discovery of the activated sludge method the necessity of devising a method of dewatering this new type of sludge has become even more urgent for the reason that activated sludge has marked fertilising properties, as Messrs. Bartow and Hatfield have pointed out.

In the activated sludge method of sewage disposal finely divided air is blown through the sewage. After some time the sludge which settles out is found to possess remarkable properties when activated with fresh sewage by the same method of aëration. The sludge has become "activated," and when blown in contact with fresh sewage the organic matter present in the latter is rapidly oxidised, practically all the intestinal bacteria destroyed, nitrates elaborated and a stable effluent formed.

"Activated" sludge, however, like ordinary sludge, contains from 95 per cent to 97 per cent of water, and still has to be dewatered before it can be satisfactorily handled.

The treatment of sewage by this method is a very promising one, for, if the fertilising value of the sludge be high, the revenue therefrom would help to pay the cost of dewatering and disposing of the sludge. Furthermore, it is a question of conservation of the first magnitude, for if a fair proportion of the fertilising value of the excreta from our cities and towns could be saved and turned back into the land, it would be a great factor towards solving our fertilising problem, particularly in conserving the supply of humus and nitrates and increasing the fertility and productivity of the soil.

In December, 1915, a small experimental activated sludge plant was started at the Toronto Main Sewage Disposal Works, Morley-avenue. Dr. Adams and J. Scott, who at first operated the plant during Colonel Nasmith's absence in France, soon proved that Toronto sludge could be readily activated, and the plant has been in operation ever since. A good deal of preliminary data has been obtained for our own information in case the city of Toronto should ever decide to adopt the method on a large scale. Among other things, we have tested the value of activated sludge as a fertiliser.

Bartow and Hatfield, in some experimental work to determine the value of activated sludge as a fertiliser, made a number of experiments with the growth of wheat in pots. The activated sludge used by them gave the following analysis:—

Total nitrogen	6·3 %
Phosphorus (P_2O_5)	2·69%

By the use of 1 ton of this sludge per acre, equivalent to 120 lb. of nitrogen, in combination with 5 tons of dolomite, ½ ton of bonemeal, and 500 lb. of potassium sulphate per acre, they obtained a yield of 36 to 37½ bushels of wheat per acre as against 13½ bushels per acre where the equivalent amount of nitrogen had been added in the form of dried blood. The straw also amounted to over 2 tons per acre as against less than ¾ ton of straw per acre where dried blood had been employed as fertiliser.

In further tests as to the value of sludge as a market garden fertiliser, these investigators used plots, each 2 ft. by 3 ft., which were treated with equivalent quantities of sludge and dried blood per acre. They obtained an increase in weight of 40 per cent in the lettuce and 150 per cent in radishes, and the growth was much more rapid in the beds fertilised with activated sludge. They conclude from their experiments "that the nitrogen in activated sludge is in a very available form, and that activated sludge is valuable as a fertiliser."

Bartow and Hatfield, in determining the amount of fertiliser to be employed, used as a basis the amount of nitrogen present. For instance, they used in their experiments the quantity of activated sludge and dried blood that would yield 120lb. of nitrogen per acre. The amount of phosphate or other ingredients present in the sludge was not considered.

THE VALUE OF FERTILISERS.

Experience has proved that the value of fresh manure as a crop-producer is from one-third to two-thirds more effective than rotted manure, because a certain proportion of nitrogen and other ingredients have been leached out of the latter and lost. Manure has a greater fertilising value than would be estimated from the amount of nitrogen, phosphoric acid and potash present. This greater value is due to the large amount of humus present in the manure; humus is not found to any extent in the commercial fertilisers, which are commonly purchased on their nitrogen, phosphoric acid or potash content.

Humus is partly decomposed organic matter, such, for example, as decayed leaves. It is found in large quantities in all fertile soils, and is probably the most valuable constitutent present, because it is not only a source of nitrogen, but it helps to keep the soil moist, loose and well aërated, as well as to provide a medium for the propagation of soil organisms so essential to the growth of plant life.

The chemical constituents in a fertiliser are not the only ones upon which its fertilising value must be determined. It would be possible to have the same amount of potash, nitrogen and phosphate in two different fertilisers and yet obtain entirely different results upon plant growth. The availability of the food material for the assimilation of the plant is a great factor. Thus ordinary septic sludge is not a good fertiliser for immediate growth of plants, results obtained the first year being poor. But the transformation of the septic sludge taking place in the soil frees the plant food material locked up in this sludge and renders it available, so that this type of sludge becomes an excellent fertiliser the second year after it has been dug into the soil. The experiences of a number of amateurs in Toronto who have been using ordinary septic sludge for several years in their vegetable and rose gardens have seemingly quite established this fact.

The truest test of a fertiliser is not the amount of nitrogen, phosphate or other chemical present, but rather the availability of these chemicals as food for growing crops and the actual increase in the yield brought about by the fertiliser. Here again fertilisers must be differentiated according to their ability to produce immediate results; whether they are available throughout the growing season; whether they leave a residue of humus and other materials in the soil; and whether or not they bring about exhaustion of the mineral elements of the soil.

Activated sludge, when air-dried, is a dark brown, friable, inoffensive material with a slightly earthy odour like that of decayed leaves. It consists largely of humus, but contains much more nitrogen, phosphoric acid and potash than does ordinary barn-yard manure. Furthermore, it is crowded with millions of the nitrifying type of organisms so essential to plant growth.

For the reasons given above as to the fertilising value of manure, we have taken this for our standard of comparison and have not compared the fertilising value of sludge with commercial fertilisers on a nitrogen, phosphoric acid or other basis. The real single, final test of any fertiliser or manure is the increase in the yield produced by it when compared with an equivalent amount of barn-yard manure.

EXPERIMENTAL PLOTS.

We selected for our plot experiments a site on very poor, humus-free clay soil, adjacent to our experimental plant. The surface was scraped to free it of any organic matter present, and 4 in. of water-washed sand was then thoroughly incorporated with the soil to a depth of 10 in. This was done to permit of aëration, to prevent the soil baking in the sun and to make it friable. Six beds, each 10 ft. by 4 ft., were then laid out and separated from the paths by boards placed edgewise in the ground.

One bed was kept as a control, and no fertiliser added to it. The second was treated with 27 lb. of air-dried horse manure, and the other four each with 27 lb. of air-dried sludge (equivalent to 14½ tons to the acre).

On May 18, 1917, the fertilisers were added and thoroughly incorporated with the soil, and on May 21st the seeds were planted in all the beds. Seeds were used except in the case of tomatoes and Spanish onions. A fairly thick planting was made so that plenty of seedlings would be available when thinning out; and a uniform number of strong seedlings of each variety could be left in each bed.

As each row of vegetables was pulled from the several beds at the same time, the complete plants, seeds and all, were placed in bags, labelled and brought to the laboratory. After the removal of adherent earth, the product of each bed was weighed; the tops, in the case of root crops, were then taken off and weighed separately, and the difference taken as the weight of the roots. Notes were also made as to the quality of the crop.

The plan adopted worked very well in practice and gave, we think, fair comparative results. Daily observations were made by the man who looked after the beds, and who was himself a gardener, as to appearance of the various vegetables, temperature, rainfall and cultivation. Every bed received exactly the same care and treatment.

We tried to eliminate every factor which might give any

* From article in *Canadian Engineer*.

advantage to one bed over another, and to remove every influence that might have had any bearing on the growth of the plants except the actual effect of the fertilisers themselves during the course of one season.

RESULTS OBTAINED.

Radishes were planted May 21st and pulled July 5th, approximately six weeks later. The same number of radishes had been left in each bed. The yield from the activated sludge and North Toronto sludge was about the same, but 40 per cent greater than that from the manured bed.

Two sets of lettuce, pulled July 19th, clearly showed the superiority of activated sludge as a fertiliser. These beds yielded double the weight of lettuce to that in the beds fertilised with ordinary manure and other sludges. Activated sludge, therefore, is a particularly good fertiliser for lettuce.

Beans, one of the legumes, were pulled August 7th, and did not show so wide a variation in the different beds as did the radishes and lettuce. Still, the crop from the beds fertilised with activated sludge and North Toronto sludge was 77 per cent heavier than the bed fertilised with ordinary horse manure.

Beets were pulled on August 16th. During the period of growth the foliage on the beets in the activated sludge bed was much more luxuriant than that of the beets in any of the other plots. The yield of tops was double that from the beds fertilised with ordinary manure, and the yield of roots 138 per cent greater. The sludge from North Toronto was considerably behind in this case.

Late radishes were not a success, though a large increase over the control was apparent in all cases; they were distorted in shape and in some cases rotted. The yield from the North Toronto sludge plot was greatest, but the sludge from the old beds, which had not been a successful fertiliser up to this time, made a good showing and indicated that aërobic action and nitrification of this sludge had taken place in the earth, rendering this fertiliser available as a plant food.

Tomatoes were picked October 2nd. During the growing season the tomato plant in the activated sludge bed had been most vigorous; the fruit had also ripened first on the beds treated with activated sludge and North Toronto sludge. The activated sludge bed gave the greatest number and the greatest total weight of tomatoes. The activated sludge gave a yield of 300 per cent increase over the manure bed, showing that activated sludge is an ideal fertiliser for tomatoes. The yield from the plot fertilised with North Toronto sludge was considerably behind the activated sludge, though away ahead of the manure plot.

Carrots were pulled on October 9th. Except in the case of North Toronto sludge, which grew some huge carrots, the yield from the other beds were all much the same as that from the bed fertilised with ordinary manure.

Onions were pulled October 9th, and did not show phenomenal growth. Sludge from the beds gave a slightly better result than activated sludge in the case of Danvers Yellow Globe, showing that this sludge had latent fertilising value. Activated sludge was the best forcer in the case of Red Weatherfield onions, giving an increase in yield of 554 per cent over the manure crop. The yield of Spanish onions was practically the same in the case of the beds fertilised with North Toronto sludge and activated sludge, but much greater than that from the manured plots.

In casting about for the reason why the sludge from the North Toronto sedimentation tanks gave us almost as good results as activated sludge, we went back over the method in use in its preparation. The sludge is pumped from the settling tanks into beds. The water gradually flows away into the drains beneath, so that in from two to four weeks the sludge is dry enough to dig out. During this drying period it undergoes anaërobic action underneath the thick black crust which forms on the surface. Eventually, however, it dries sufficiently for aërobic action to take place in the spongy mass. The sludge is then dug out of the beds, carried away on small dump cars and deposited in long heaps where it lies exposed to the sun and air until finally removed.

In all probability a somewhat similar series of nitrifying actions which occur in activating sludge occur accidentally in this method of drying North Toronto sludge, rendering it suitable for immediate assimilation by plants. It would seem very probable that any sludge dry enough to be spaded would, if thrown into shallow heaps or spread out in layers on the ground, be converted by oxidation and bacterial action from a form not readily assimilable by plants to one readily assimilable by them. The same action would occur when dug into the earth itself, and presumably more rapidly in a porous soil than in a heavy clay soil. This latter point seems to be evident from results obtained from the anaërobic sludge dug from the old Morley-avenue sludge beds. This sludge made a very poor showing early in the year, but later on in the season appeared to be more readily available for the growth of plant life.

CONCLUSIONS.

From the above results it is clearly evident that activated sludge is a most valuable fertiliser. It seems to be true that crops such as lettuce, where the foliage itself is eaten, or crops like beans, beets or tomatoes, which demand a heavy growth of plant and leaf if the yield of roots or fruit is to be heavy, can be stimulated into very heavy growth by the use of activated sludge. The increase in the yield of onions due to this fertiliser is also great.

For the growth of lettuce or tomatoes under glass, activated sludge should, theoretically at least, prove to be a most valuable fertiliser. In the case of radishes, though the final weight was not materially greater, the radishes matured much quicker which is just as valuable to the market gardener as if his crop were greater, for the quick growth is what is wanted. The same holds good of lettuce or beets, in which the growth is much more rapid than it was with the other fertilisers tested. These points are now being tested by experiments under glass.

It should be noted that the amount of air-dried manure added (14½ tons per acre) is about the maximum amount that could be used, and therefore in all probability the maximum crops capable of being produced by the addition of manure had been produced. If this is true, then the increase in yield due to activated sludge is very striking, and places at once a high monetary value on this material, for the value of fertilisers must be directly proportional to the crop returns yielded by them.

THE FUEL AND LIGHTING ORDER.

OFFICIAL REPLIES TO HOUSEHOLDERS' QUESTIONS.

The following are official replies to questions addressed by householders to the Coal Controller arising out of the Household Fuel and Lighting Order:—

A. is a publisher's editor and author. His income as author is earned by homework done at night. Is he eligible for increased fuel and light ration as a home worker?	Yes, if he can prove to the local fuel overseer that it really entails extra fuel and light which cannot be met out of the scale allowance, and the absence of which would entail material hardship. See Clause 11.
Are householders who have neither gas for any purpose nor electric light in their houses entitled to more than the ordinary ration?	No. Gas and electricity cannot be converted into coal.
Why does the first application form householders fill in (F.H.F.2) ask for particulars of coal and coke supplied since May 1, 1918?	Because outside London there has been no rationing and record of consumers' deliveries, and the careful recital of these figures will assist the various parties concerned to be sure that the stock is correctly stated.
Can a gas-driven motor vehicle be supplied with gas from a private house or a hotel?	No fuel is to be specially allowed to private houses or hotels for the purpose of supplying gas or electricity for this purpose. Motorists will at present be able to continue to obtain these facilities at public garages or supply stations, if they are otherwise entitled to use their cars. It is intended later also to control the supply at such establishments, distinguishing between essential requirements and otherwise. In a very limited number of cases, where the local fuel overseer is satisfied that there is some serious difficulty in obtaining the supply as above, he may recommend a special consent to about 7,500 cub. ft. a month of gas (or 120 b.t.u. of electricity) for essential cars.

INCORPORATED SANITARY ASSOCIATION OF SCOTLAND.

ANNUAL CONGRESS PROGRAMME.

The forty-fourth annual congress of the Incorporated Sanitary Association of Scotland will be held at the Golden Lion Hotel, Stirling, from September 4th to 6th next. The programme is as follows:—

WEDNESDAY, SEPTEMBER 4TH.

7 p.m.—Annual Business Meeting in the Committee Room, Municipal Buildings, Stirling.

THURSDAY, SEPTEMBER 5TH.

10 a.m.—Opening of congress proceedings.
10.15 a.m.—Presidential address by Mr. John Frew, County sanitary inspector, Linlithgowshire. Subject: "Individual Responsibility in Sanitation."
10.45 a.m.—Discussion on the proposed Ministry of Health.
2.0 p.m.—Discussion: "Rating and Taxation in Relation to Local Government Administration."
3.0. p.m.—Discussion: "Some Future Developments in Sanitary Administration."
7.30 p.m.—Reception of members in the Municipal Buildings, Stirling.

The following day will be devoted to discussions on certain phases of maternity and child welfare.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Stirling T.C.—The town council have voted £247 for the enlargement of the pig-breeding station at the slaughter-house.

REFUSE COLLECTION AND DISPOSAL.

Leyburn R.D.C.—It was reported at the last meeting that men could not be found to clean out ash-pits, and Dr. Cockcroft remarked that the situation was becoming serious. The sanitary officer said that farmers might do the work after the harvest.

Sunderland T.C.—A scheme is being considered for the provision of a depot and to instal plant for dealing with refuse and scrap.

ROADS AND MATERIALS.

Alresford R.D.C.—The council approved the recommendation of the surveyor, Mr. P. B. Grinham, that application be made to the Government to have five roads declared roads of national importance, as they were roads bearing a great deal of military traffic. If sanction is obtained it is considered that it might ease the difficulty of obtaining repairing material for the roads.

Armagh R.D.C.—The council have adopted a resolution calling the attention of the county council to the state of the roads in the Ahorey and other districts, many of them, it was stated, being almost impassable.

Axminster R.D.C.—The council have passed a resolution urging the county council to proceed with the levelling of the dangerous gradient on a portion of Tytherleigh Hill.

Aylesbury R.D.C.—The council have received the necessary authority from the Road Board to proceed with the repair of the Halton roads.

Chippenham R.D.C.—The surveyor, Mr. A. H. Lapham, reports that, owing to the shortage of road stone, he is increasing the extent of tar-spraying. With respect to a letter from the Great Western Railway Company asking, with a view to estimating their prospective liabilities as to rates, if the council were making any arrangements for making up roads and other repairs after the war, the chairman said the council had made some provision, but a great deal of money had been absorbed owing to the extra cost of labour and materials. The clerk was directed to reply that the council had invested £1,500 underspent money in War Loan, and that there would probably be a surplus this year to be added to that amount.

Denbighshire C.C.—In answer to a complaint with respect to the repair of the Ruthin road, near Bwlchgwyn, upon which it was stated £8,000 was being spent, Mr. J. A. Harrop said the road was being repaired with silica, the hardest stone which could be produced in the county, and when the work was completed it would be one of the best roads in the district.

Hampshire C.C.—At the last meeting it was stated by the chairman of the Main Roads and Bridges Committee that since the war broke out the council had carried out or undertaken to carry out roadwork amounting to something like £300,000. That was for all classes of roads, and the great difficulty the county surveyor (Mr. W. J. Taylor) had had to meet in carrying out the work would be understood. Throughout the negotiations, which were often very difficult, the War Department had met the council fairly and straightforwardly, and it reflected credit on the county surveyor and the War Department that they had never had any friction whatever. That large amount of work had taken labour and material away from what he might call civilian roads, main roads which were not of national importance.

Marylebone B.C.—It has been decided to lay down tarmacadam in Newman-street, at an estimated cost of £560, and to re-coat Hollam-street, at an estimated cost of £340.

Okehampton R.D.C.—The council have applied for a migratory camp of ten German prisoners for the repair of the Okehampton-Northlew road, which is in continuous use by the Road Transport Committee for the carriage of Government timber.

Stirling T.C.—The town council have resolved to purchase property, at a cost of £2,000, for widening St. Ninian's-road and Weaver-row, at a point where they at present form a dangerous junction.

Tanderagee R.D.C.—The county surveyor, Mr. R. H. Dorman, reported that the condition of the majority of the roads in the district was deteriorating owing to the quantity of stone required not being put on during the past four years. This year he anticipated a larger quantity of stones would be raised and broken than had been the case for some years, but so far it had been found impossible to arrange for the carting of the bulk of it, and for any stones that had been carted a very high price had to be paid, amounting in some cases to 4s. per ton. He hoped the council would do what they could to induce farmers in the district to cart material during any spare time they might have for their horses.

Wellingborough U.D.C.—The Highway Committee reported that the county surveyor had stated that the main roads in the district are for the greater part in good condition, that a few short sections needed resurfacing, but that on the whole the roads are well maintained. The report, the council agreed, was a great credit to Mr. R. S. Henshaw, the surveyor.

West Suffolk C.C.—The Highways Committee reported that the Bury and Haverhill road had cost £28,866, of which the Road Board had contributed £14,433, the War Office £9,433, leaving £5,000 to be paid by the county council. The same committee also reported they had received a letter from Mr. W. L. Jenkins, the county surveyor, stating he had been promoted to Captain in the R.E., and expressing the hope the Highways Committee would not deduct the increased pay attached thereto from the allowance made to him. The matter was referred to the Clerical Staffs Committee, with a view to the whole question of the allowances to employees serving in the Forces being reconsidered.

Whitley Upper U.D.C.—The council have accepted a revised tender for steam rolling at £1 10s. per day, the council to provide fuel.

SEWERAGE AND SEWAGE DISPOSAL.

Halesworth U.D.C.—The council have resolved to obtain expert opinion as to the feasibility and cost of a proposed scheme for the purification of the river. It is suggested that the river should be diverted and straightened at the west end of the town, two sets of lock-gates erected, the space between the two locks to be the receptacle for the impurities which might gather there, and each night the gates to be opened to allow the rush of fresh water to carry all sewage matter through the town and flush out the river bed. It was also suggested that another pair of lock-gates should be erected at the east end of the town, in order that about a foot of water should be kept in the bed of the river. It was thought German prisoners would be available for the work, and that there would be no great difficulty in arranging with the few owners affected in acquiring the land for the purposes of the scheme.

Norham and Islandshires R.D.C.—A complaint was made as to an alleged nuisance in the south-east part of the district caused by the military, and the chairman expressed some doubts as to whether they could enforce sanitary laws at present against the military. Mr. Carr held it would not do to allow the military to create a nuisance if it was to the danger of the public health, and it was agreed that the clerk should be asked to assist the surveyor in having a settlement arrived at.

Warmley R.D.C.—Owing to the number of complaints received the council have asked the medical officer to report whether the objectionable smells arising from the Bath outfall works were injurious to health.

WATER, ELECTRICITY, AND GAS.

Darfield U.D.C.—A joint committee of urban districts is negotiating upon the purchase of the Dearne Valley waterworks undertaking.

Greenock T.C.—It was reported that the nett credit balance on the electricity undertaking for the past financial year was £7,561. The salary of the engineer, Mr. Frank H. Whysall, was increased by £100. With respect to the water undertaking, there was a debit balance of £2,344, due entirely to abnormal conditions.

Hythe T.C.—A proposition having been submitted for the fixing of water meters at certain premises, the borough surveyor, Mr. G. F. Miller, reported the impossibility of obtaining meters, and stated that, even supposing they could be purchased, the date of delivery could not be guaranteed, and the cost would be exorbitant. A special committee was therefore formed for the purpose of considering a fixed rate for various trades, and they suggested a series of differential rates for tradesmen which the town council agreed to in an amended form.

Linthwaite U.D.C.—The council will consider at their next meeting the question of installing electric light.

Melton U.D.C.—The council have purchased from the Stanley Engineering Company, Bath, an 8-h.p. oil engine and pump for the water-pumping station at Sealford for £85.

Port Glasgow T.C.—The town council are considering the provision of new gasworks on the ground recently acquired by them at Fyfe Shore from the Caledonian Railway Company. The estimated cost of the proposed new works is £60,000. It

has been decided meanwhile to proceed with the erection of a new holder at Fyfe Park, and continue to make the gas at the existing works. This portion of the work is estimated to cost about £30,000.

Skelton and Brotton U.D.C.—A committee has been appointed to confer with representatives from the other local authorities in East Cleveland to consider what steps might be taken with a view to the public bodies becoming the owners of the Cleveland Water Company's works for the supply of water to the district.

Wantage U.D.C.—It is proposed to erect a new gasholder and instal a sulphate of ammonia plant.

Welshpool T.C.—The council have agreed to the appointment of a sub-committee to prepare a scheme for an additional supply of water, and also report upon the desirability of the corporation undertaking the installation of the electric light. The council have obtained a lease extending their powers for dealing with their reservoir and waterworks on the Earl of Powis's property.

MISCELLANEOUS.

Aberdeenshire C.C.—Deeside District Committee are considering a letter from the Braemar Special District Committee in favour of the construction of a light railway from Ballater to Braemar, and also a communication from the Aberdeen District Committee suggesting an extension of the proposed Echt and Skene light railway to Tarland.

Christchurch T.C.—The borough surveyor, Mr. H. J. Farmer, submitted a statement concerning the expenditure of the air-compressing station since certain alterations and improvements were made. For the half-year ending June, 1917, the consumption of anthracite coal was 56 tons odd, and for the half-year ending June, 1918, it was 34 tons odd, a saving of 21 tons odd, or £45 18s. The consumption of oil had been reduced from 147 gallons to 73, a saving of 74 gallons, or £12 15s.; while the consumption of gas had been reduced from 86,172 cub. ft. to 40,510 cub. ft., a saving of 45,662 cub. ft., or £9 15s. The total saving had thus been £68 8s. 6d. for the half-year. The borough surveyor saw no reason why there should not be a similar reduction next half-year, making roughly £140 for the year.

INSTITUTION OF MUNICIPAL ENGINEERS.

NORTHERN DISTRICT MEETING.

A meeting of the Northern District of the Institution of Municipal Engineers was held in the Town Hall, Newcastle-on-Tyne, on Saturday last. Those present included Messrs. W. J. Coulson (Cramlingham, who occupied the chair), J. Dinsdale (Weetslade), W. Bean (Longbenton), J. P. Walton (Hexham), C. W. Hall (Felling), H. Lee (Hebburn), F. Hargreaves (Consett), J. H. Mole (Chester-le-Street), G. Symon (Blaydon), J. Davison (Morpeth), J. Harding (Hetton-le-Hole), J. W. Holbrook (Houghton-le-Spring), R. Appleby (Newbiggin), W. B. Thomas (Southwick), T. Lewton (Seaham Harbour), W. Mastaglo (Blaydon), E. Milburn (Crook), and J. Jameson (Ponteland, hon. sec.).

The minutes of the previous meeting were read and confirmed. The election of members of the council was discussed, and Mr. Symon moved that if it would save the expense of an election the Northern District were willing to withdraw three names if other districts would withdraw the same number in proportion. The motion was seconded by Mr Mole and carried.

Mr Mole nominated Mr. Hall (Felling) as a vice-president. This was seconded by Mr. Bean and carried.

A discussion on the Fuel and Lighting Order then took place, Mr. Symon opening by giving a list of the things to be done and the order in which they had to be done. Captain Greeves and Mr. Isherwood attended the meeting, and after Captain Greaves had given a description of the working of the Order a general discussion took place, both gentlemen answering questions and giving their opinion on different points. On the motion of Mr. Holbrook a hearty vote of thanks was passed to the two gentlemen for being present.

Mr. Mole moved that the question of returns from dealers and merchants registered in another district should be decided and that the question be sent to Sir Johnston Wallas to be answered at a meeting of fuel overseers which was to be held shortly. This was seconded by Mr. Hall and carried.

A vote of thanks to the Lord Mayor for the use of the room concluded the meeting.

AYLESBURY MEETING.

A report of the meeting of the institution held at Aylesbury on Saturday last will appear in our next issue.

PERSONAL.

Mr. A. A. Piccaver, surveyor to the Long Sutton Urban District Council, has resigned.

Mr M. Oliver, acting borough surveyor of Bodmin, has been appointed local coal overseer.

Mr. J. P. Punch, county surveyor of Carlow, has had his salary increased from £300 to £425 a year.

Mr. H. T. Mather, surveyor to the Surbiton Urban District Council, has been voted a war bonus of £57.

Mr H. T. Chapman, county surveyor of Kent, has had his salary increased from £800 to £1,000 a year.

Mr. W. L. Jenkins, county surveyor of West Suffolk, has been promoted to the rank of Captain in the Royal Engineers.

Mr J. Knight and Mr. T. Gill, surveyors of highways, have been appointed joint coal overseers by the Bodmin Rural District Council.

Mr. A. P. Harcourt, who has been invalided from the Royal Engineers, has been appointed temporary borough surveyor of Marlborough.

Mr. William Pare, surveyor to the West Bridgford Urban District Council, attains his "majority" in the service of the council this year. The *Nottingham Journal* states that in "West Bridgford during many years Mr. Pare has found a field for the development of ideals, and a council and constituency which have approved them. Bridgford has advanced and still advances."

OBITUARY.

Mr. Charles Haddock, manager of the Bury Rural District Council's sewage disposal works at Ringley and Prestobe, died recently, we regret to state, aged fifty-nine.

KILLED IN ACTION.

Private Ewart James Roberts, of the Royal Berkshire Regiment, who was a member of the official staff of the borough surveyor of Kidderminster, was, we regret to state, killed in action on the 8th inst.

MOTORS AND MUNICIPAL WORK.

Ilford Urban District have purchased a second-hand 15-h.p. Talbot car for £400.

Ossett Town Council are considering the purchase of a steam wagon for highway work.

Rotherham Watch Committee have under consideration the purchase of a new motor fire engine.

Hampstead Borough Council have purchased a Ford van for £160 for use in connection with the national kitchens.

Knaresborough Rural District Council will consider shortly the purchase of a traction engine and three wagons.

Hythe Town Council at their last meeting agreed to purchase two petrol wagons for house-refuse collection.

Gloucester Town Council are considering a recommendation to purchase an electric lorry for hauling coal and ashes.

The Electricity Committee of the Manchester City Council are inviting tenders for the supply of a 3½-ton electric tipping wagon.

Tilbury Urban District Council have accepted Messrs. Merryweather & Sons' tender for the supply of a 300-gallon Hatfield fire-engine.

King's Lynn Town Council have instructed the borough surveyor, Mr. A. J. Smith, to prepare a report on the advisablilty of motor traction for municipal work.

Thornaby Town Council have been unsuccessful in their application to the Local Government Board for sanction to the purchase of a motor fire engine, and it has been decided to obtain a motor tractor for hauling the fire engine.

Road Damage in Berkshire.—Mr. A. Langston Yockney, the acting county surveyor, states in his annual report that, owing to the heavy military traffic, many of the Berkshire roads continue to suffer severely. Further lengths of the granite sides of the trunk roads have been destroyed by this abnormal traffic, but the Tarmac centres continue, on the whole, to stand the strain exceptionally well. Referring to the appointment of a Military Controller of Roads and Bridges and Road Control officers, Mr. Yockney says: "It is understood that it is proposed to assist local authorities to enforce their claims for damage. Until this scheme is in working order it is impossible to say how the proposed objects will be attained. It would seem that there are serious legal difficulties in the way. In any event much additional clerical work will be thrown on the local authorities." Mr. Yockney adds that the maintenance of the roads in passable condition has been rendered more difficult by the scarcity of stone and by the increasing difficulty of obtaining sufficient team and manual labour.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is there anything new in the suggestions contained in an article in the *Times Engineering Supplement* of August as to the necessity for engineers, medical men, geologists, chemists and bacteriologists being associated when works of sanitary engineering are taken in hand? Is it not evident that in many cases most of these scientific branches of the various professions should be consulted? But will local authorities rise to the occasion and pay the necessary fees for such a consultative board? Is it not all very well for the *Times* to suggest the evident advantage of what it calls "the need for team work;" but will it be able to educate local authorities up to the standard essential for the success of such a scheme?

* * * *

With regard to reinforced concrete ships, is there not some considerable cause for apprehension that unless very special precautions are taken to prevent the infiltration of sea water to the steel reinforcements, oxidisation will ensue with disastrous results? Was not Prof. H. J. M. Creighton, of Swarthmore College, Pennsylvania, justified in drawing attention to this danger in a paper he recently read before the Faraday Society, and is it not to be hoped that some methods have been devised to prevent the new ships being affected?

* * * *

Is it not interesting to learn that recent studies by antiquarians have revealed the fact that the ancient Romans standardised nearly all their pottery, building materials, &c.? If this is so, and the result was the erection of such beautiful and symmetrical buildings, should we be afraid of following their example, and standardise the materials and fittings of the cottages and houses which will have to be erected for the accommodation of the working classes?

* * * *

Is not one of the chief difficulties in connection with the question of a more general use of water power in order to conserve our coal supplies that of the uncertainty and want of uniformity in our rainfall? Is it not essential that power for driving all classes of machinery should be constant and unvarying; and can this be achieved by storage under such conditions? Is not also the level nature of most of the areas of this country rather a handicap in making the best use of such a power, where quantity is the principal, if not the only, force which can be employed in making use of water power?

* * * *

Do we not now constantly come across painful scenes in London and other towns where overloaded, and, it is to be feared, underfed horses are struggling and falling on the slippery pavements? Is not the secretary of the Society for the Prevention of Cruelty to Animals quite justified in having issued a circular letter to a large number of local authorities asking them to see that a more liberal use of sand or grit should be employed in order to minimise this slipperiness? But is this possible at the present time owing to the dearth of suitable materials and the scarcity of labour and haulage?

* * * *

If Mr. Dryland, the able county surveyor of Surrey, is correct in his statement that from his experience and observation he is of opinion that corrugation or waves are formed in the surface of our roads by the harmony of the "constant" of the traffic on our roads, which has a direct relation to the plasticity of the track surface, is it not evident that the only cure for this tendency to movement of the surface would be the employment of less plastic materials than the bituminous compounds which now find so much favour with our road makers? Were it not for some of the objections to the use of unsurfaced concrete, would not this material, which is decidedly non-plastic, meet the difficulty, and give the necessary rigid surface?

COAL STOCKS.

POSITION OF GAS AND ELECTRICITY UNDERTAKINGS.

The position of gas and electricity undertakings is so serious as regards coal supplies that the Coal Control Department has been obliged to make special arrangements in cases where relatively large stocks are in hand. These are now being drawn upon to make good deficiencies of other undertakings not so well off for coal. The attitude of the Distribution and Supplies Branch is that all public undertakings must be kept going so long as coal is available, and, in the national interest, those that have supplies must be prepared to assist those that have not until such time as the general position improves.

Managers of public utility undertakings have real cause for anxiety, particularly gasworks, which are more restricted than electric stations in their choice of coal and its source of origin. The stocks of both are far below what they were at this time last year, and the position is an anxious one.

HOUSING NOW AND AFTER THE WAR.

A GOVERNMENT SCHEME.

Mr. A. W. Shelton, F.A.I., who was appointed by the late Lord Rhondda a member of the Local Government Board Housing Advisory Committee, was the guest of the Aldwych Club recently. He said that the present dearth of working-class dwellings was roundly 450,000, and was growing at the rate of 75,000 each year. Probably, therefore, when peace came, fully 500,000 new houses would be needed, quite apart from the normal growth of requirements. Provision for at least 1,000,000 new cottages should be made and carried out within five years of peace. He had reason to believe that a scheme recently submitted to and now under the consideration of the President of the Local Government Board is in effect a partnership between the State, the local authority, the building society, and the tenant. It provides for the building of houses by private enterprise at a price which would give the builder a living profit.

LABOUR SUGGESTIONS.

In view of the conference of Greater London housing authorities, convened by the London County Council for October 30th, Mr. Herbert Morrison, secretary of the London Labour Party, has invited the Housing Committee of the council to consider the advisability of taking the following steps:—

Declaring immediately every possible acre of unbuilt-on land, within a 30-mile radius, a "town plan" area under the Act of 1909, so as to control future development and to found a number of new towns on garden city principles; seeking Parliamentary powers to secure absolute control of all building and rebuilding operations in the County and City of London for the preservation of desirable historical features and the prevention of the unhealthy crowding of persons and industries; and endeavouring to evolve such administrative housing machinery as will preserve the maximum local interest and variety and secure that a bold and comprehensive scheme for the re-ordering of Greater London's industries and residences shall be inaugurated immediately after the war.

SCOTTISH ARCHITECTURAL COMPETITION.

The Treasury have now conveyed to the Local Government Board for Scotland their approval of the conditions governing the architectural competition about to be promoted by the Institute of Scottish Architects under the authority of the board. The competition is open to any British subject, and is divided into three sections. The first two sections are for lay-out plans, accompanied by designs of (1) two-storey cottages and flats, and (2) tenements restricted to three storeys. The third section is for the design of cottages for rural areas without a lay-out plan. The accommodation to be provided in the various types of houses comprised in all three sections varies from a living-room, scullery, and two bedrooms, to a living-room, scullery, parlour, and three bedrooms. Intending competitors in sections (1) and (2) will be duly furnished with plans of selected sites (upon which their schemes have to be based).

Premiums to the total value of £725 will be awarded by the Committee of Selection for the most meritorious designs.

As the result of the competition, a panel of architects whose designs are approved by the Committee of Selection will be formed, and a list of the names on the panel will be furnished to local authorities preparing post-war housing schemes, with a recommendation from the board that architects on the panel should be appointed to advise in carrying out such schemes.

The conditions of competition—which will be issued *in extenso* at an early date—reflect concisely the official mind as to the nature of after-the-war houses, and we commend their perusal, not only by all architects, but also by all those concerned in this burning question. In due course public notice will be given as to where copies of the conditions are obtainable.

Abergele Urban District Council have instructed the surveyor, Mr. W. J. Edwards, to prepare plans for fifty houses.

Portsmouth Town Council have decided to enter into negotiations with a view to securing an option of purchasing 500 acres of land on the southern slopes of Portsdown Hill, between three and four miles from the borough boundary, in order to undertake, if necessary, an after-war housing scheme.

Dorking Urban District Council have approved a report prepared by the surveyor, Mr. S. S. Gettings, in which he deals with the limits of local authorities' powers under the Public Health Acts and by-laws, refers to possible sites for houses abutting on existing streets, and treats of town-planning procedure. The housing scheme, it was explained, can be considered entirely by itself without regard to town planning, but the General Purposes Committee were of opinion that a provisional scheme of town planning for the whole of the district should be prepared, and that the housing scheme should be prepared to conform with it. In accordance with this proposition the surveyor will in due course prepare a town-planning scheme.

GUEST'S IMPROVED BUNDLING PRESS.

The new design of improved hand-bundling press submitted by Hollings & Guest, Limited, of Thimble Mill-lane, Birmingham, which we illustrate below, is of particular interest to users of baling machines. Guest's well-known all-metal bundler has become one of the most popular on the market, and has given every satisfaction to users; but as this firm are out to make their press absolutely the best offered to the trade, they have fitted an improved and quicker method of operation by means of a toothed rack and pinion which incorporates a release, enabling the plunger to be either dropped or wound down to its work very rapidly. A great saving of time is hereby effected, and this feature, together with the quicker return action and the new design of cross-head, which is now fixed instead of movable, combines to make the press extremely quick working, and rigid in construction. The improvement in the time taken to operate the press will be greatly appreciated by firms who require a baler for regular use, and who require to turn out the maximum number of bales in the minimum amount of time. To such firms we can recommend Hollings & Guest's latest design, which is the result of practical experience. The new model has been well tested, and the makers now claim it to be far and away quicker in operation than any other baler on the market.

As before, the press is strongly constructed of steel plates, reinforced where necessary, and will be found powerful, handy and reliable, and capable of giving excellent service wherever there is anything baleable. The firm will be pleased to send illustrated price list to anyone interested.

Swansea Borough Surveyor and the Coal Order.—The war has thrown greatly added work on the Swansea borough surveyor, who did not seek the appointment of administering the new household coal order which the town council placed upon him. Alderman Merrells stated at the last council meeting that the work of his department was, through the war, already many months behindhand, and if Mr. Heath was given the additional duties as indicated it would mean the borough surveyor's department would be years behindhand. But the point was that, whether Mr. Heath was given the work or not, the greater part of it would fall upon his shoulders in any event, as he is the sole possessor of much of the information that is required under the Order.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

FOREMAN.—September 1st.—Cramlington Urban District Council.—Cramlington Council Offices, Cramlington, Northumberland.

INSPECTOR OF NUISANCES AND SURVEYOR.—September 2nd.—Paul Urban District Council.—Mr. C. Aitken, clerk, Council Offices, Paul, Cornwall.

ARCHITECTURAL ASSISTANT FOR HOUSING.—September 3rd.—Burton-on-Trent Town Council.—Mr. George T. Lynam, borough engineer and surveyor, Town Hall, Burton-on-Trent.

SURVEYOR AND INSPECTOR.—September 4th—Bromsgrove Urban District Council. £260 a year.—Mr. Francis, J. Russon, clerk, Town Hall, Bromsgrove, Worcestershire.

SURVEYOR.—September 5th.—Failsworth Urban District Council. £200 a year, with £50 war bonus.—Mr. H. C. Broome, clerk, Council Offices, Failsworth, Lancs.

HOUSING AND TOWN PLANNING ASSISTANT.—September 10th.—Southgate Urban District Council.—Mr. D. S. Sutherland, engineer and surveyor, Town Hall, Palmer's Green, N. 13.

TEMPORARY ENGINEERING ASSISTANT.—September 16th.—Barrow Town Council.—Mr. W. C. Persey, borough engineer and surveyor, Town Hall, Barrow-in-Furness.

TEMPORARY CLERK.—Hampstead Borough Council. 34s. per week and 19s. war bonus.—Mr. Oliver E. Winter, borough engineer, Town Hall, Hampstead N.W. 3.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

PORTSLADE-BY-SEA.—September 3rd.—For the erection of a national kitchen.—Mr. E. H. Kemp, clerk, Urban Council Offices.

GLAMORGAN.—September 4th.—For rebuilding and repairing wall.—The Clerk, County Hall, Cardiff.

GODALMING.—September 6th.—For the erection of two cottages.—The Borough Surveyor, Municipal Offices, Bridge-street, Godalming.

GLOUCESTER.—September 9th.—For the erection of a pavilion of twelve additional beds at the tuberculosis block of the Oban hospital.—City Surveyor, Guildhall, Gloucester.

Engineering: Iron and Steel.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories, &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

BURLEY AND MENSTON.—The Joint Sewerage Board are offering for sale two complete suction-gas producers.—Mr. Harry Riding, engineer and surveyor, Council Offices, Menston, near Leeds.

CAERPHILLY.—The urban council offer for sale a Merryweather's improved sliding carriage telescopic fire escape.—Mr. T. H. Richards, Council Offices, Caerphilly.

Roads.

DUNMOW.—September 10th.—For the hire of a steam roller.—Mr. A. E. Floyd, clerk, Rural Council Offices, Dunmow, Essex.

BRAINTREE.—September 11th.—For the supply of 600 tons of broken granite.—Mr. H. H. Nankivell, surveyor, Vestry Hall, Braintree, Essex.

Sanitary.

BLACKWELL.—For the construction of works of surface drainage and storm overflow.—Mr. H. Silcock, surveyor, Rural Council Offices, 67 Westgate, Mansfield.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

SEPTEMBER.

4-6.—Incorporated Sanitary Association of Scotland: Annual congress at Stirling.
14.—Institution of Municipal and County Engineers: Meeting at Bridgwater.
20-21.—Institution of Municipal and County Engineers: Meeting at Middlesbrough.
27-28.—Institution of Municipal and County Engineers: Meeting at Penarth and Barry.

APPOINTMENTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

COUNTY BOROUGH OF BURTON-UPON-TRENT.

WANTED—First-class Architectural Assistant for Housing Scheme. Applications, stating age, experience, and salary required, accompanied by copies of three testimonials, should be sent to the undersigned not later than 10 a.m. on Tuesday, the 3rd September, 1918.

GEORGE T. LYNAM,
Borough Engineer and Surveyor.

Town Hall,
Burton-upon-Trent.
August 23, 1918. (3,860)

The Surveyor

And Municipal and County Engineer.

Vol. LIV. SEPTEMBER 6, 1918. No. 1,390.

Minutes of Proceedings.

Problems of Reconstruction.

The decision of the Ministry of Reconstruction to issue a series of pamphlets dealing with various phases of the work for which it is responsible is one which will meet with general approval; for the ramifications of what has come to be called the problem of reconstruction are so great that there can hardly be an individual who is not directly concerned with some aspect of it. The first of these pamphlets, a copy of which is before us, deals in general terms with the aims of reconstruction and consists of extracts from speeches by the Minister skilfully strung together so as to form a connected account of the main problems to be solved and the way in which they are being approached. The first idea to be grasped is, of course, that reconstruction does not mean simply a return to pre-war conditions. On the contrary "it has to give shape and satisfaction to the strong feeling which has arisen in all sections of the community, among men and women of the most widely differing opinions and outlook, that there is very much to be ashamed of when we look back to the conditions of July, 1914, and that out of justice to the living and out of reverence to the dead we are called to rebuild the national life on a better and more enduring foundation." Thus the problem is in the main a social and industrial one, and involves such diverse questions as shipping, the obtaining of raw materials in the markets of the world, their allocation (in view of inevitable shortage) to the most essential trades, their inland transport, the provision, by a carefully prepared scheme of demobilisation of labour to work them, the fostering of cordial relations between Capital and Labour, the development of agriculture, and a general improvement in the social conditions of the workers. So far as municipal engineers are concerned, the two principal phases of reconstruction are those relating to inland transport facilities and housing. As regards the former, Dr. Addison points out that the highways of the country have been allowed to fall into disrepair during the war, and estimates that some sixty millions sterling will be required to restore them. It is at least satisfactory that the magnitude of the problem is realised, and we shall await with interest some details of the proposals of the Government for dealing with it. Housing forms the subject of separate pamphlets, and we hope next week to deal with that relating to England and Wales.

* * * *

The Doctrine of Misfeasance.

Surveyors are familiar enough with the broad principle of law that in fixing liability for accidents resulting from the condition of a highway the local authority are only responsible if they have committed some definite act of misfeasance as distinguished from mere non-feasance or omission to repair. Like most attempts to state the law epigrammatically, however, this rule is difficult to apply in many "border-line" cases. For example, take the case where in the execution of repairs something is left undone which ought to have been done: is this misfeasance or non-feasance? In the case of *McClelland* v. *Manchester Corporation*, which was decided in 1912, Mr. Justice Lush took the view that it was illogical in such a case "to sever what was omitted or left undone from what was committed or actually done"; and that once the local authority execute any works, they are as guilty of misfeasance if the works are defective because of some omission as they are if the work in fact carried out is defective. In the recent case of *Moul* v. *Croydon Corporation* it was sought to extend this principle and to suggest that where an accident was caused through the bulging up of wood paving after a heavy fall of rain—*primâ facie* a clear case of non-feasance—the local authority were guilty of misfeasance in the original use of wood blocks, which were inherently liable to become dangerous in the manner indicated. To this view, however, the court did not accede, and the corporation were held not to be liable. In the course of the argument one or two other border-line cases were mentioned by way of illustration. For instance, a highway authority, in repairing a road as a whole, may omit to do any work at all on one part of it, which in consequence becomes dangerous; or, finding two holes in a road, they may repair one and leave the other. These cases are, of course, hypothetical only, and have not been the subject of judicial decision as yet. They only go to show that the two cases to which we have referred by no means exhaust the possibilities of argument upon a doctrine the logical foundation of which it is a little difficult to appreciate.

* * * *

Labour and Housing.

The Labour Housing Association, who held their annual conference at Derby last Saturday, seem to be under no illusion as to the feasibility of meeting and solving the housing problem, even during the continuance of the war. They ought to know something about labour conditions, and presumably it was this knowledge which prompted the resolution which was passed demanding that the Government should permit local authorities to build houses during the war. Government restrictions upon building operations are of course part of the general policy which has for its object the winning of the war, and as a result of this laudable objective local authorities are faced with the greatest difficulty in obtaining labour of any description. How they would fare as regards labour alone—and this is only one of the many impedimenta they have to reckon with—if a scheme of war-time house building was sanctioned is a matter on which they would necessarily require a clear understanding before they ventured to put housing schemes into operation. Even the Labour Housing Association could not at the present juncture conjure up men with the facility with which Roderick Dhu did upon a memorable occasion. Still, time is an all-important consideration, and it is to be hoped that the association will avail themselves of the opportunity of placing before the Government such practicable and economic proposals as they had in view when they adopted the resolution to which we have referred. As regards the other aspects of the housing question dealt with in the series of resolutions passed at the meeting, while one of them at least is debatable—that declaring the need for State loans free of interest—others, such as the kind of houses required and their structural equipment, have been receiving and continue to receive a full measure of professional and official consideration.

* * * *

Government Building Contracts.

We imagine that few, if any, of those competent to form an opinion on the subject have not viewed with concern the policy which has been adopted by most Government departments during the war of abandoning the system of competitive tendering for building contracts, and substituting payment to contractors of prime cost plus a percentage to cover establishment charges and profit. This concern has now been voiced by certain leading quantity surveyors, a weighty letter from whom appeared in the *Times* on Wednesday. In the course of this letter it is pointed out that the new system is both dangerous and wasteful, as under it there is no incentive on the part of the contractor to exercise any check upon the quantity or quality of the labour expended nor to regulate the salaries and wages paid. Moreover, all mistakes made by the contractor are paid for, and the whole conduct of the work tends to become lavish and careless. The reason suggested for the adoption of this system is that of the urgency of the works to be carried out;

but we are inclined to agree with the writers of the letter that instead of time being saved a great deal is lost in correcting errors due to want of accuracy and information. It is at least significant that the Office of Works, which is the greatest building department, adheres to the contract system, and we venture to hope that the whole question may yet be reviewed by one of the many committees that have been appointed to watch such matters in the national interest.

* * * *

Technical Education.

Although by far the greater number of municipal engineering pupils and assistants, who would normally now be considering their programme of studies for the coming winter, are away on active service, there must be still a considerable number who will desire to avail themselves of the usual opportunities for technical education. We therefore once more call attention to the courses in municipal and sanitary engineering provided in connection with the Manchester Municipal College of Technology. The syllabus, which includes both practical and theoretical work, is designed for a three-year course, and comprises not only all the recognised branches of municipal engineering work, but also mathematics and such subjects of pure science as afford a basis for the technical work. For fourth year students are provided opportunities for advanced study and research in municipal and sanitary engineering, as well as in other divisions of the faculty of technology. We strongly recommend any of our younger readers who may live within a convenient distance of Manchester to procure for themselves a copy of the full prospectus of the courses for the session 1918-19, and to take full advantage of the exceptional opportunities which this college affords. There can be no doubt that in the strenuous days through which we shall have to pass after the war a systematic scientific training will be more necessary than ever as a condition of success in municipal—and, indeed, all—engineering work.

SCOTTISH DRAINAGE REGULATIONS.

By John Fyfe,
Sanitary Inspector, Stirling.*

Rules and regulations to govern the carrying out of drainage and plumbing work of new buildings and existing properties equally applicable to all over Scotland should be framed, and I am sure that the proposed drainage and plumbing regulations which have been incorporated in the by-laws drawn up some time ago by the Institution of Municipal and County Engineers and revised by a committee of the burgh officials of Scotland should be adopted, as these regulations are very comprehensive, especially in one or two very important points The by-laws are still under consideration, but when finally adjusted, approved of and passed into law they will promote a general advancement with beneficial results on the sanitation of our buildings generally and dwellings in particular.

Some recognised standard should also be adopted in the testing of drainage, both for cast-iron and fireclay piping. This is a subject that requires some thought, for, besides the quality of the material and the fixing of a standard apparatus for testing, atmospheric conditions have to be considered.

PUBLIC SERVICE POSTS FOR THE DISABLED.

LOCAL GOVERNMENT BOARD'S APPEAL.

In conjunction with the Ministry of Pensions and the Ministry of Labour, the Local Government Board is urging on local authorities the desirability of providing, as far as possible, employment in the local public services for discharged disabled officers and men. The central associations, representing county councils, municipal corporations, and urban and rural district councils, have already passed resolutions recognising the special claims of the disabled, and favouring the grant of preference to such men for employment in the service of local authorities, and it is now proposed that in each area these authorities should co-operate with the Pension Committees and the Employment Exchanges in filling vacancies in the various services under their control.

In a circular letter addressed to county councils and sanitary and poor law authorities, the secretary of the board calls attention to the resolutions referred to, and adds: "Mr. Hayes Fisher is wholly in sympathy with the spirit of these resolutions, and I am directed by him to invite attention to the circular which has been addressed by the Minister of Pensions to all Local War Pension Committees with a view to giving practical effect to them. Mr. Hayes Fisher trusts that the local authorities will see their way to meet the suggestions which Local War Pension Committees may put before them on the lines indicated in it."

* From a paper presented yesterday at the annual congress of the Incorporated Sanitary Association of Scotland.

MUNICIPAL ENGINEERING WORK IN BIRMINGHAM.

By Henry E. Stilgoe, M.Inst.C.E.,
City Engineer and Surveyor.*

Of the work carried out by the department during the past year the most important, as affecting the city as a whole, has been the preparation of a scheme for widening all the main arterial roads to a minimum of 110 ft. or 120 ft. This scheme, which provides for a tramway on sleeper track, with a carriageway and footway on either side, was approved by the city council on January 8th. It provides for the widening of 43 miles of radial main roads and the construction of 7 miles of new roads. It is the greatest and most complete scheme of arterial road improvement which has ever been placed before and adopted by any corporation in this country. It will have a far-reaching effect, not only in dealing with the ordinary traffic of a great manufacturing district, but, by providing facilities for quick-moving traffic and the construction of tramways on independent sleeper tracks, it will be of great assistance in solving the housing problem by facilitating the development for building purposes of land near the outskirts of the city.

Owing to the continuance of the war it has not been practicable to carry out any large constructional schemes, but a scheme for the improvement of the Hockley brook and the reconstruction of the Hockley main sewer, estimated to cost about £300,000, has been prepared and has been approved by the city council, and authority has been given for a section of the work to be commenced.

ROAD UPKEEP.

Despite the difficulties under which the department is working, the highways of the city have been kept in a reasonable state of repair, although there has been great shortage both of labour and materials.

Repairing macadamised streets cost £131 10s. 4d. per mile; repairing granite pavements, £111 6s. 10d. per mile; repairing wood pavements, £248 5s. 3d. per mile; cleansing paved streets, £252 1s. 4d. per mile; cleansing macadamised streets, £66 11s. 10d. per mile; watering paved streets, £1 5s. 10d. per mile; watering macadamised streets, 3s. 11d. per mile; gritting paved streets, £11 2s. 1d. per mile; gritting macadamised streets, 9s. 7d. per mile.

The area of wood pavement under maintenance contract with the Improved Wood Pavement Company is 128,866 sq. yds. The amount paid during the past year for such maintenance was £5,118, being at the rate of 9·53d. per sq. yd., this payment covering according to contract the cost of entire renewals where necessary. The approximate area of wood pavement maintained directly by the corporation is 203,314 sq. yds, the cost of which during the past year was £1,796, being at the rate of 2·12d. per sq. yd. This figure refers to repairs and cost of renewals where necessary.

TAR-COATING MACADAM ROADS.

The total area of macadam surface tar-sprayed was 4,043,158 super. yds.; the area sprayed a second and third time was 60,596 super. yds., making an area of street equal to 3,982,562 super. yds., comparable with a length of 305 miles, 6 fur., 218 yds. The cost of the work was £17,112, being at the rate of 1·01d. per super. yd.

With the extended use of tar-spraying, its benefits—economical and sanitary—have become increasingly apparent. The tar preserves the road surface by preventing or reducing the infiltration of rain water and (through its plasticity) by reducing the attrition of the surface by vehicular traffic; dust and mud are consequently reduced to a minimum, which lessens scavenging and watering and is of obvious benefit to the health of the community. To enable the work to be done expeditiously and economically, the provision of additional tar storage and heating tanks in various parts of the city has continued during the past year.

In connection with the cleansing of the streets, two "Pioneer" sweeping and loading machines have been purchased. These are an improvement on the earlier types of this machine. The mud or dry material can be swept from the streets and elevated and loaded direct into the steam wagon to which the machine is attached. The operation, as compared with the system of hand sweeping and loading into carts, is a great saving in time and money.

Dumbarton Waterworks Extension.—With the consent of the Ministry of Munitions, Dumbarton Town Council have just completed a useful extension of their waterworks. Under their Provisional Order of 1914 they acquired the right of the Milton Braes, and they have diverted 105 acres of the watershed into Loch Humphrey by linking up the loch with the Moor Dam. The pipe is estimated to deliver 200,000 gallons per day. The scheme has cost £1,300.

* Extracts from annual report.

Municipal Salvage.

By J. C. DAWES, Technical Adviser to the National Salvage Council.

[Address delivered at the Annual Meeting of the Institute of Cleansing Superintendents.]

The Director-General of National Salvage, in his address to the institute this morning* has indicated the great possibilities of one form of municipal salvage, that of reclaiming from ordinary house refuse several of the articles of which it is usually comprised, and which, in the aggregate, are well worth salving for economic reasons quite apart from the importance they now have in relation to the acute shortage of raw materials. This is, perhaps, the form of salvage the various officers and delegates present to-day are most interested in, though it is not the only form of salvage in which we are interested as representing the National Salvage Council.

It might be of interest to some delegates to know that we are quite as keenly interested in the salvage and utilisation of waste from industrial processes.

The figures quoted by Mr. Currie are remarkable, but they do not represent the 100 per cent mark of efficiency in cleansing department salvage operations, because he indicated the possibilities of "inorganic" salvage work only, and did not fix the maximum for the salvage and utilisation of "organic" material. It will be agreed that he has fixed for us a high ideal, but one well worth striving for.

It is recognised that superintendents are at the moment severely handicapped in their ordinary work by the shortage of labour and transport, but difficulties which on paper appear insuperable can be and have been to some extent overcome. This is proved by the fact that we are actually carrying on, and are still able to continue the sanitary service of the country.

It is quite true that these services are not complete or sufficient, but so long as we are able to continue them at all we are in a position to achieve salvage results. In other words, so long as we are able to collect we are able to salve.

I mention this in anticipation of the criticism that, the 100 per cent mark being quite impossible in view of the extreme difficulties of labour and transport, really successful salvage work is not a practical proposition. The will to salve is quite as important as labour and transport facilities.

We are seeking to achieve the highest possible mark of efficiency in all our administrative and cleansing methods, and we confidently hope to succeed in this, but no one expects that we shall be able to do it in a day, or even a year, but it is quite safe to say that we shall go on until we do achieve this end. It is the main object of all our efforts. More than this, it is the fundamental principle upon which our institution is based, and we acknowledge it as our reasonable duty. I want to suggest that we apply the same principle to this newer but not less important phase of our work.

Experience has shown that a great deal of very useful salvage work can be done to-day, even though the 100 per cent mark may soar high above us. It will be possible to do more to-morrow than to-day, since salvage work must develop with experience. The more we try, the more we shall approximate to the highest point of efficiency. It must be recognised that the question of efficient municipal salvage is up to us, so to speak.

THE SHRINE OF HYGEIA.

Coming to the particular work of cleansing surepintendents, I am afraid we have been rather obsessed with one main idea, and one idea only. We have ardently worshipped at the shrine of Hygeia, but we have worshipped at it too blindly. We are primarily hygienists, and must remain so, but this does not constitute a reason for neglecting the commercial or salvage possibilities of our work, especially in view of the very important fact that hygienic disposal and waste utilisation are not incompatible. Disposal by utilisation can be made as hygienic in character as disposal by incineration, and much more so than dumping. Moreover, effective utilisation work is sound economics, of which we hear so much in these days, and which are expected to assume very considerable importance in post-war days.

We are constantly reminded of the foresight of Germany in this respect, and are so often asked to behold the spectacle of what applied science may mean to a nation. It must be admitted that in pre-war days we neglected our chemists. To-day it is the rule to refer with a certain amount of envy to those countries who fostered and favoured their chemists; but all this talk will amount to nothing if we do not bestir ourselves to develop a better economic sense based upon the application of science to industry.

It is doubtful whether we shall ever again be in such a position that we can afford wilfully to waste so much valuable material. This applies not only to industry, but to municipalities. Every large corporation should have a well-organised salvage department, and I would suggest that the department best adapted for this work is the one responsible for public cleansing work, because of the excellent collection and transport facilities it must always afford.

At the present moment the prospects of efficient municipal salvage are good, and this is a point of importance. Over 200 local authorities are now engaged more or less in salvage operations. Some have delved much more deeply into the question than others, and have established the axiom that the deeper one goes the more interesting and successful the work becomes.

It might be argued that salvage and utilisation work is no new thing in our cleansing department. That is well-known, but most of us will be prepared to admit that the salvage work done in pre-war days was very incomplete. Another fact is well-known in the same connection, and that is that we have for years salved materials for disposal in other countries. Because of this term "municipal salvage" is touched with a certain amount of irony, but no blame can be attached to municipalities for what took place before the war.

I need not outline the history of the various companies who purchased our salved materials. Sufficient is it to say that the purchasers made the markets. In other words, the value of our waste material was recognised in other countries before it became apparent at home. It is not too much to say that home markets—by markets I do not mean agencies—practically did not exist. To-day they do exist, and, given proper technical development on the part of producer and user, they must always exist, and, what is more, time will develop them.

"REFUSE."

I desire to impress upon the conference one point of supreme importance. There is a distinct sphere for local authorities in salvage operations, a sphere which no outsider can fill, and, if neglected, one which must lead to great waste of valuable material. I refer, of course, to the salvage of material assembled from household surpluses, and now universally but wrongly termed "refuse." For convenience, however, we will continue to use the term in our discussion.

Seen in the mass, refuse as collected appears to be nothing more than a heterogeneous mixture of useless material, but when sorted and classified it takes on quite a new appearance, and incidentally a new value.

Nobody would describe a quantity of paper as refuse. The same applies to so-called garbage. Textiles do not come under this heading, neither do waste blood and bones—two of the most wonderful and potential materials to be found anywhere. Metals are not rubbish; neither are glass, rubber, &c.; but, notwithstanding this obvious fact, these are the actual materials we have destroyed, and are still destroying, in thousands of tons as though they were entirely valueless.

Had they descended upon us like manna and cost neither money nor labour in production or transport, we could not even then have pleaded a sound excuse for our wastefulness, because it is beyond our power to rob these materials of their potential values. When, on the other hand, we calculate production and transport costs, and remember the uses to which these materials can be applied, we discover why it was the German had such good grounds for appreciating the value of Britain's waste materials, and for coveting her stocks, and here let me say that the German was not the only one who recognised the value of municipal salvage work in pre-war days. The French were almost as keen, and the Americans went further than either in certain directions.

The unæsthetic appearance of waste material was abhorrent to us, and we cared but little about potential values. The chemist and business man of the countries just referred to gave less thought to the æsthetic and more to the commercial side of the work. Therefore they succeeded not where we failed, but where we never tried to succeed.

It is not necessary now to enter into technical details concerning the several uses to which salved materials can be usefully applied. This has already been done at the district conferences which have been held throughout the country, and can, if necessary, be gone into thoroughly during the discussion which is to follow.

I would prefer on this occasion to deal more directly with actual salvage than utilisation, and briefly to indicate some of the methods of reclamation and preparation of various materials prior to sale.

Following Mr. Currie's lead, I have selected fuel, paper, textiles and metals.

Taking the subject of fuel first, for at least a generation past we have enjoined the householders of Britain to sift their cinders. The injunction, for the most part, has been ignored, and we have received, and shall continue to receive, millions

* See last week's SURVEYOR, p. 99.

of tons of valuable fuel in house refuse every year. The unfortunate attitude of the householder in no way justifies a local authority in sending those millions of tons of fuel to the dump, when a reasonable scheme for the salving of the same can be introduced.

It is estimated that the local authorities of this country collect 9,450,000 tons of refuse per annum, and of this amount practically 40 per cent or 3,780,000 tons is partially burned fuel.

We have had samples of this material collected from various places at various times, and have submitted these to different chemists in order that we might fix an average calorific value. It has been found that the calorific value of washed cinder salved from house refuse approximates 10,000 b.t.u.'s as against 14,000 b.t.u.'s in good steam coal. Therefore after deducting 1,436,000 tons of unwashed cinders, the amount now consumed in destructors for the purpose of raising steam, and yielding a coal equivalent of 449,000 tons is estimated to be equal to 2,226,000 tons of coal.

Incidentally, one may remark that this fact constitutes a striking indictment of the primitive design of the great majority of fire-grates in this country, and there is something to be said for the view taken by those who claim that the truest form of economy in this connection would be to consider the question from the point of view of obtaining a better combustion of fuel, or, better still, by the extended use of fuel in the form of coal gas, but it would take generations to effect such a change. Our present duty is therefore clear. It is for us to salve what at present is being wasted, and to do this effectively and completely requires the installation of mechanically operated separation plants.

RECLAIMED FUEL.

Makers of ordinary screening plants look upon the problem of fuel recovery from refuse and the subsequent washing of it as one presenting no great difficulties; in fact, several local authorities have already ordered such plants, and we shall not have long to wait before we are able to prove or disprove the claims of the manufacturers.

The uses for reclaimed fuel are many, but I venture to think that there are few corporations who could not themselves use the material with advantage for steam raising purposes, and thus effect a substantial economy in the use of raw fuel.

Washed cinder with a calorific value of 10,000 b.t.u.'s, or 70 per cent of the original calorific value of the raw fuel is very valuable to-day, yet we are wasting the equivalent of two and a quarter million tons of coal per annum.

It is estimated that the inclusive cost of separation, screening and washing will amount to approximately 1s. 9d. per ton of refuse treated in a plant capable of dealing with 100 tons per day of eight hours and working full time. One hundred tons of refuse per day represents the average collection in a town of 130,000 population. Smaller plants would, of course, be necessary for smaller towns.

SALVING OF WASTE PAPER.

Waste paper is now a valuable commodity. Notwithstanding all the efforts made to salve paper in this country, large quantities are still being destroyed under the guise of refuse. Unless this material is salved by local authorities it will be lost. It is not necessary to again remind you of the importance attaching to the salvage of waste paper, or the uses to which the material can be subsequently put. These matters have been fully considered at our district conferences. The point I wish to make clear is that the salvage of paper is not at all a difficult matter. On the contrary, it is comparatively simple, and, according to the class of permit held, the work is profitable.

Before the war a very large proportion of the paper salved in this country was exported to the Continent to be pulped. The paper-pulping industry has now been better established at home, and it is very important that municipalities shall act as feeders to these pulping mills, not only in the days of war, but afterwards.

The Director-General has informed us of the amount of shipping which might be saved if we salved all waste textiles from refuse. A new point arises here.

It is common knowledge that under certain circumstances a textile fabric may become the vehicle of transmission in the case of certain zymotic diseases. Indiscriminate and unrestricted totting from refuse should therefore be prohibited, and all salved rags effectively sterilised, under the auspices of the local authority, prior to disposal. To do this an efficient disinfecting apparatus would be necessary, and such apparatus should form part of the plant at every up-to-date municipal reclamation or utilisation works. I need not describe these machines. They are well known to us.

(To be concluded.)

Lavender on Sewage Farm.—Wealdstone Council have grown lavender at their sewage farm, and it is being distributed among the wounded in hospitals.

ROAD CLEANSING.

AN IMPROVED STRAKER-SQUIRE MACHINE.

If ever a proverb is true it is surely the one that "He who rests rusts," and in no field is this more strikingly brought out than in the various mechanical appliances dealing with road-improvement machinery.

The accompanying photograph depicts the last word embodying the collective experience of several years' work in the endeavour to do away with dust-raising revolving road brushes and substituting the cheaper and more efficient product of Jupiter Pluvius—viz., the ever-present moisture from the heavens.

The mechanical points brought out in this machine are, in the first place, to cover a wider spread of road both by water and squeegee, and this has been executed by the designer by arranging three power-spray water-nozzles intead of two as in earlier patterns, thus making it possible to cover 40

Straker-Squire's Latest Road-Washing Machine.

miles of roadway during a night's washing, and a similar or even larger mileage during the day on flushing work.

Readers can readily form a conclusion as to performance when it is stated that with all three nozzles going 2 miles of washing are accomplished on a 1,100-gallon filling of the water tank. Needless to say that in changeable weather, such as is the average in England, there is no necessity for using the whole of the three nozzles, and in wet weather they can be partially closed, thus halving the quantity of water used. This, of course, reacts in the way that in perfectly dry weather the quantity of water would slightly fall below the average of 2 miles to one filling. On macadam roads where the power-spray is impossible and only gravity sprinkling admissible, the filling of the tank would practically last double the time. These few indications will make it possible for anyone to compare the enormous saving this last product of the Straker-Squire works represents, as against the old methods of road brushing.

The Newhaven Surveyorship.—Upon the receipt of a letter from the surveyor, Mr. C. T. Cooper, resigning his position, it was at Newhaven Urban District Council resolved recently that, in view of the increased cost of living and the urgency of proper supervision of the drainage of the town, the surveyor's salary be increased to £220 per annum, that he give a guarantee that he shall do no outside work, and that he shall be required to give three months' notice upon his desiring to resign.

United States Highway Council.—A Canadian exchange states that in the future all functions of United States Government agencies relating to streets and highways will be coordinated in a body called the United States Highways Council, with the intention of eliminating delays and uncertainty incident to the present method of taking up each problem with a separate department of the Government. The council has adopted a form of application for relief in highway matters which is to be submitted to the Government through the respective State highway departments. All of these departments have been supplied with copies of the application form. This form emphasises as of first importance the maintenance of existing streets and highways; second, the reconstruction of badly damaged streets and highways; and last, new construction justified by war or economic necessity.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter X, combinations such as X.Y.Z., and words such as "engineer" and "surveyor," should never be used.*

Highway Abutting on River: Subsidence.—"C. T. J." writes: Will you kindly give me your opinion on the following: T.-street abuts on the River T., which has a tidal rise of about 17 ft.; the road is maintained purely to reserve to the corporation a right of access to the river, but there is no landing stage. The action of the tides has caused damage to the river frontage, and the surface of the street is showing signs of subsidence, and the fence of the shipyard is also showing signs of subsidence. The shipbuilding company have drawn my attention to the dangerous condition of T.-street where it abuts on the river and have asked me to restore the river frontage. I reported this to the corporation, who have requested me to report further as to who is liable for the repairs. T.-street is a public street, and has been dedicated. I have seen the engineer to the Conservancy Commissioners, who say they have no responsibility, which rests entirely upon the owner of the land. The land forming T.-street was, previous to being paved, &c., owned by the shipbuilding company, and although the street is dedicated they still own the freehold. As the surface of the street only vests in the corporation, they do not think they are liable to make good the river frontage. Will you kindly give me your opinion as to whether the corporation or the owners of the subsoil are liable to make good? Do you know of any case similar to this? If so, can you quote it?

Assuming that T.-street is reparable by the corporation, not only the surface of the street, but all the stratum of soil below the surface required for the purposes of the street is vested in them, and if the river frontage forms part of the street for the purpose of repair the corporation are liable to repair it, so far as may be necessary to make the street safe for ordinary traffic. Whether the frontage does form part of the street for the purpose of repair is, I think, a "question of fact," which, in the event of any proceedings being taken, would have to be determined by a jury. See *R.* v. *Lordsmere* (54 L.T., 766). I do not think the owners of the subsoil are liable. I do not know of any similar case.

Repair of Footbridges.—"J. P." writes: (1) A public footpath which was in existence before the passing of the Highway Act, 1835, leads from a main road to a church and crosses a small stream by a plank bridge, which has recently been washed away by a flood. Neither the bridge nor the path has ever been repaired by the council. Is the town council liable for the restoration of this bridge? (2) A second case is that of a wooden plank bridge crossing a stream at its junction with the River Wye. This is now in a state of disrepair and dangerous to passengers. This bridge connects what was until sixty years ago a towing path for barges coming up the River Wye, and is situated 200 yds. outside the corporation area. The towing path and bridges within the borough area have since been repaired by the borough. The rural district and parish councils decline to repair the bridge, which is in their district. Who is responsible—the rural district council, the parish council, or the riparian owners?

(1) Assuming that the footpath was a public path before the passing of the Act of 1835, and that the bridge forms part of the path, both the path and the bridge are reparable by the council, unless it can be proved that some other body or person is liable to repair them *ratione tenuræ*, or otherwise. The duty of repairing the bridge includes the duty of restoring it when necessary. See *Rex* v. *Bucks* (12 East, 192). (2) Upon a similar assumption, and with the same qualification, the rural district council are liable. The parish council *may* repair, but they are not bound to do so.

Temporary Buildings.—"Nigel" writes: Have a local authority power to sanction the erection of buildings of a temporary character, not constructed in accordance with the by-laws?

In districts in which sec. 27 of the Public Health Acts Amendment Act, 1907, is in force the local authority can approve plans of temporary buildings (whether they comply with the by-laws or not), and may attach to their approval any condition which they deem proper with regard to the sanitary arrangements of the building, the ingress thereto and egress therefrom, protection against fire, and the period during which the building shall be allowed to stand; and if it is not removed within that period the owner is liable to penalties, and the authority can pull it down and recover the expense of its removal, either from the owner or from the builder. Where this section is not in force the authority cannot sanction any "*building*" that does not conform to the by-laws. But there appears to be nothing to prevent them from sanctioning structures of a temporary character which are not "buildings" within the meaning of the by-laws. In order, however, to secure the removal of such structures when the period for which they are sanctioned has expired, it would be necessary for the authority to take a bond, with sureties. See *Parsons* v. *Timewell* (44 J.P., 296).

Fencing: Sec. 68 Railway Clauses Consolidation Act, 1845.—"Ynys" writes: An allotment field rented by the Urban District Council Allotments Committee is on one side adjoining a narrow-gauge railway, elevated by an embankment about 8 ft. On the other side of the embankment and railway is another field in the occupation of a butcher, whereon sheep are periodically kept. These sheep jump on to the railway embankment, and in some instances have by another jump downwards entered the allotment field and caused damage to the vegetation. In the first place I wrote to the butcher (owner of sheep) directing him to prevent any further trespass and damage by the erection of proper fencing, and he complied by the placing of rushes held by stones along the top side of the embankment. But this primitive fencing did not prevent an occasional sheep from reaching the railway embankment, and they would have entered the allotment field were it not for the watchfulness of some of the holders. I again notified the butcher, and on this occasion he replied by referring me to the Railway Clauses Consolidation Act, 1845, and intimated that the railway company should be compelled to provide a fencing on the embankment at the side of the rails. I therefore wrote the railway company, and they reply "that the embankment separates the fields, and that it is therefore a matter between adjoining owners as the sheep do not belong to the company, and the allotments have been laid out recently." Will you kindly advise (*a*) who can be held responsible in event of damage to the vegetation—the butcher or the railway company? (*b*) whether the railway company can be compelled to provide a fence at the side of their railway, which is elevated 8 ft. from the adjoining fields on each side?

(*a*) It is the duty of the railway company under the above section to fence "the land taken for the use of the railway from the adjoining land on each side," and I think they would probably be held liable for damage done by sheep straying from the butcher's field on to the allotment field in consequence of their failure to perform this duty. (*b*) In my opinion the company can be compelled to perform their statutory duty by providing a fence on each side of their land, separating it from the adjoining fields.

HOUSING NOW AND AFTER THE WAR.

Deeside District Committee of the Aberdeenshire County Council have appointed a committee to consider the erection of artisans' houses.

Newport (Mon.) Housing Committee have agreed to a scheme for the erection of 1,000 houses on the eastern side of the borough at an estimated cost of £500,000.

Ripon City Council have instructed the city surveyor, Mr. A. Barlow, and the assistant city surveyor, Mr. Hill, to prepare a housing scheme for Aismunderby.

Lincoln City Council have made a start with the erection of 200 houses on the Wragley-road site, the Associated Lincoln Builders having undertaken the work of construction.

Chelmsford Town Council have adopted a scheme for the erection forthwith of 960 houses for working-class families on a site which will allow of twelve houses to the acre.

Mr. G. B. Hartfree, surveyor to the Alton Urban District Council, has prepared an exhaustive report on the housing requirements, which the council have ordered to be printed and circulated.

Ipswich Town Council have approved the purchase of 99 acres between the Felixstowe and Clacton roads for a housing scheme. It is estimated that upwards of 1,000 houses could be erected on the site. It is also proposed to build 400 houses elsewhere.

Welshpool Town Council have approved the report of the Housing Sub-committee proposing the erection of forty houses in various districts, but with respect to the acquisition of land for the purpose, the mayor stated that nothing could be done because "they had not a penny piece."

MOTORS AND MUNICIPAL WORK.

Hayes Urban District Council will consider the purchase of a motor fire engine.

Portsmouth Board of Guardians are desirous of purchasing a motor ambulance with capacity for two stretchers.

A sub-committee of the Glasgow Corporation will report on a proposal to purchase an Argyle chassis for the ambulance at Shieldhall Hospital.

Sheffield Town Council have decided to purchase two British-made electric chassis instead of those for which an order has been given.

Barnstaple Rural District Council have been informed that the price of the new steam tractor ordered some time ago at £1,100 would probably be increased to £1,200, and it was decided that the sum named would be the maximum paid, and to fix a time for delivery.

Glasgow's Profits from Refuse.—Glasgow cleansing superintendent, in his annual report, states that during the past twenty years the corporation has saved £50,000 by selling tins, paper, and clinker. Now manure is prepared from refuse, and realised £6,700 last year.

Institution of Municipal Engineers.

MEETING AT AYLESBURY.

A meeting of the South-Eastern District of the Institution of Municipal Engineers was held at Aylesbury on Saturday, the 24th ult. Among those present were Messrs. Reginald Brown, M.Inst.C.E. (president-elect), G. Belson Chilvers (district chairman), S. Pickering (hon. district secretary), W. J. Budds (Newport Pagnell), W. Cripps (Winslow), H. B. Eames (Bicester), F. L. Reynolds (Buckingham), H. T. Smith (Beaconsfield), E. Pollard (Leighton Buzzard), D. Pearson (Bicester), W. H. Taylor (Aylesbury), and W. A. Turnbull (Aylesbury). Councillors present included Messrs. R. W. Locke (the Mayor of Aylesbury), P. Robinson (chairman of the Electricity Committee), F. Hitchings (chairman of the Sewage Committee), J. T. Mountain (chairman Bicester Urban District Council), and others. Mr. B. Wyand, secretary of the institution, also was present.

The members were received in the town hall by His Worship the Mayor; and Mr. Reginald Brown, who occupied the chair during the proceedings, in responding to the welcome, gave a brief outline of the working of the Household Fuel and Lighting Order, 1918.

WORKING OF HOUSEHOLD FUEL AND LIGHTING ORDER.

Mr. Brown said that first and foremost he wished to point out that local authorities would do well to offer the position of fuel overseer to their surveyor. The Coal Controller had not without some considerable thought, he was certain, named this official as one who was particularly suitable for the position by reason of his special knowledge of the district and the buildings therein. Although in the Metropolis the overseer worked directly under the Coal Controller, it had been thought fit outside that area to place the working of the Order in the hands of a local committee, the overseer having considerable independent powers. Whilst the Metropolitan method might very well have been adopted in the larger towns, still nothing but good, he was sure, would be the outcome of co-operation with a local committee. In carrying out the provisions of the Order all over the country the main thing to bear in mind was that sympathetic treatment should be extended between all parties interested, whether it be the merchant, the official or the consumers. The success of the Order rested upon hearty co-operation. Whilst the official's duty was to see that all consumers had their fair share of fuel, it was also his duty to hold an even balance between the rights of the consumer and those of the local merchant. The duty of the merchant was to supply only as much fuel as he had authority for, whilst the consumer had a much more important duty, and that was to economise in the use of fuel to the greatest possible extent so as to relieve the anticipated serious shortage due to the needs of the great conflict in which the country is engaged. He would say to the overseers, "Let the people know through the Press what they have to do; give them every facility to come to you for advice as to how they should fill in the various forms." He urged them to fix upon definite hours on one or two days in the week when they could be seen by the public.

In the management of their offices they must have method and everything in its place so as to save their time when reference was needed. As it was necessary to have the previous consumption for any particular premises of gas or electricity, he found it the best plan immediately on receipt of Form 2 to have the name and address of the consumer written on Form 3 and to send this blank form to the gas and electricity company, or both if necessary, for them to enter the previous consumption in the spaces provided. If this was done daily the return of these forms by the companies could be easily checked, because there should be a corresponding form in the hands of the overseer. The checking of Form 2 could be proceeded with whilst blank Form 3 was being dealt with by the gas or electricity companies, and any matter thereon requiring verification could be attended to. On receipt of Form 3, with the previous consumption of gas and electricity marked thereon, the overseer would allocate the amount of fuel in coal and gas or electricity and the lighting allowance and send it to the consumer, who would return it in due course with his acceptance or otherwise, and with a statement of the proportion in which he desired the allowance. After the overseer had checked this he would send out his certificates to the merchants. He (the speaker) always made a practice also of sending out Form 7 to each consumer stating exactly what he had been allowed for his guidance and reference, even although the ultimate certificates were similar to his own requests. On Form 2 the overseer would see that the consumer could ask for (1) a special assessment, (2) ordinary allowances, (3) additional allowances. When a special assessment was asked for Form 4 was sent to the consumer for him to fill in the necessary particulars, and whilst it was in his hands it would be as well for the overseer to ascertain the previous consumption of gas and for electricity. The settlement of allowances on Form 4 required very great care. If item (3) was asked for in addition to item (2), the latter could be dealt with in the usual way, and Form 6 sent to the consumer for him to return particulars of the purposes for which he desired a special allowance. The certificate of the overseer on the back of Form 6, which was returned to the consumer for him to hand to his merchant, was the warrant for the additional supply. The coal merchants, like everybody else, were understaffed, and they should be treated in as sympathetic a manner as possible. If the work was carried out methodically the burden and worry would be greatly lightened.

The Mayor of Aylesbury said he had been extremely interested in Mr. Brown's remarks in regard to the Order, and they had given him a great deal of useful information. The only difficulty that he could see in the carrying out of the Order was that the merchants would not have sufficient coal to meet the demands of their customers, and he was afraid the poor coal merchants were in for a very rough time indeed.

The following paper was next submitted to the meeting:—

MUNICIPAL WORK IN AYLESBURY.

By W. H. TAYLOR, Borough Engineer and Surveyor.

With the exception of several roads in the centre of the town, the highways of the borough of Aylesbury are all surfaced with granite. The cost of repairing one of the principal roads last year was as follows:—Area covered, 7,162 sup. yds.=14·8 sup. yds. per ton of granite. Cost, £1 2s. 8d. per ton of granite, or 18·35d. per sup. yd. In 1916 Buckingham-street was coated with tarred granite supplied by the Ceiriog Granite Company, and although subject to very heavy traffic the road is standing very well. The area covered was 2,235 sup. yds. 2-in. tarred granite covered 10·78 sup. yds., 1 in. 34 sup. yds., and the whole of the granite 8·2 sup. yds per ton. Cost, £1 10s. 1d. per ton of 2-in. granite, or 2s. 9½d. per sup. yd.

TAR-PAINTING.

Since 1909 the main roads have each year been treated with tar. The tar is obtained from the local gasworks and applied to the road by means of a small spreader attached to a 50-gallon copper. The tar, after being applied to the road, is well brushed in by hand and clean Leighton sand sprinkled on the surface. Last year the area treated was 99,473 sup. yds., the cost being 1·623 pence per sup yd., with tar at 3½d. and 3¾d. One gallon of tar covered 4·43 sup. yds. One ton of sand covered 173 sup. yds. The average area covered per day was 1,658 sup. yds.

CONCRETE KERB AND CHANNELLING.

Concrete kerbing and channelling has been used in Aylesbury for about seven years, and over 3,000 yds. have been laid. It is made by the council's workmen and has proved satisfactory and is suitable for any of the roads in the town except on hills, where it might be unfairly used by the drivers of vehicles running the wheels against the kerbing. At first wooden moulds were used, but after a time these were discarded in favour of iron moulds.

The section of the kerbing is 5 in. by 10 in. deep, in lengths of 3 ft. It is slightly tapered at the top and rounded. The tapering is to avoid a cartwheel damaging the whole of the face. The section of the channel blocks is 9 in. wide by 4 in. deep, in lengths of 15 in., and is slightly dished on the surface. The channelling when laid is protected by a row of 4 in. by 4 in. stone setts. The aggregate for the kerb and channel blocks is in the proportion of one of Portland cement to three of ¼ in. to dust Clee Hill granite chippings. The kerb and channelling are always laid on a bed of Portland cement concrete 4 in. in thickness and bedded with cement and sand. The cost of making the kerb is 7d. per lin. ft. and the channel 4¼d. per lin. ft., and when laid complete on 4 in. of concrete costs 2s. 9d. per lin. ft.

HIGHWAY YARD AND DEPOT.

The town's yard is in a very central position, and comprises stabling for eight horses, steam-roller shed, cart and materials shed, foreman's office, stores, workshop and messroom for workmen. Six horses are owned by the council at the present time, and team labour can be hired at 13s. per day for horse, cart and man.

The cost per horse is £90 6s. 8d. per annum, or £1 14s. 8d. per week. At the present time we are paying £3 15s. 2d. per week for the hire of horse, cart and man. Adding the wages of the carters (£1 11s. 3d.) to the cost of keeping the horses (£1 14s. 8d.), amounting to £3 5s. 11d., there is a saving of

9s 3d. per horse per week, and I am sure there is more work done by the corporation horses than by hired horses.

STREET LIGHTING.

The street lighting is carried out by the corporation, and of the 283 street lanterns in the town 280 are illuminated by electricity (60-watt lamps) and the remaining three are illuminated by gas. Owing to the police restrictions and the Daylight Saving Bill only an average of 90 lamps were alight each night during last year, and the cost per lamp amounted to £3 4s. 5d.

HOUSING SCHEME.

A scheme was prepared by the author in 1913 for the erection of fifty houses on a piece of land, 3·89 acres in extent, in the Oxford Road, which is situated in the west part of the town. The scheme consists of three types of houses—namely, A, B and C. Type A consists of a living-room, 14 ft. 7½ in. by 12 ft. 1½ in.; scullery, 11 ft. 10½ in. by 8ft.; coals, food store, water-closet and three bedrooms. Type B consists of a living-room, 14 ft. 3 in. by 11 ft. 1½ in.; scullery 10 ft. 10½ in. by 8 ft.; coals, food store, water-closet and three bedrooms. Type C consists of a living-room, 13 ft. 3 in. by 12 ft. 7½ in.; scullery, 10 ft. 6 in. by 6 ft. 6 in.; coals, food store, water-closet and two bedrooms. The scheme was about to be placed before the Local Government Board when the war broke out, so nothing further has been done.

SEWAGE DISPOSAL WORKS.

The sewage disposal works are situated about 1¼ miles north of the town, and consist of a screening chamber, five open sedimentation or settling tanks, one roughing filter, twelve contact filter beds, two storm-water filter beds, 12 acres of land and pumping plant.

Mr. Chilvers, proposing that a vote of thanks be accorded to Mr. Taylor for his able and interesting paper, said he would like to know how it was possible for Mr. Taylor to get the corporation horses fed at the present time at 10s. 7d. per week? With regard to the tar-painting of the roads, he (Mr. Chilvers) had not found that it had answered so well. He liked slag chippings, or, preferably, small granite chips.

Mr. Eames seconded the proposition, which was carried with acclamation, Mr. Taylor suitably acknowledging the compliment.

In the course of the discussion that followed, the Chairman congratulated Aylesbury upon recovering its charter, remarking that it was now an important borough. As far as the highways of the borough were concerned, it seemed to him that the cost put down by Mr. Taylor for repairing these was very reasonable indeed. He would like to ask why he used tarred granite in place of the usual tarred slag? It was an extremely low price for granite when they compared it with the price for slag. Mr. Taylor had raised the question of tar being applied by hand, and he quite agreed with him in that matter, and also with his remarks about the use of ashes. The cost of keeping the corporation horses was low, and he believed that it was far preferable for a council to have the work done by its own horses than by hired horses. He noticed that the wages for the workmen in that department worked out at about 5s. 3d. per day, and he would like to know what amount of war bonus was paid. He thought the time was coming when municipal engineers would take the question of the illumination of public streets into consideration and find out a better system of lighting, and probably a more economical one. He did not look upon an item of £179 mentioned in connection with the baths as a loss at all. It worked out at 3½d. per head of the population, and that was a very low price to pay for the improved health of the district. Aylesbury was to be congratulated upon having public-spirited men to come forward to form a voluntary fire brigade, and in that connection he would like to know what system was adopted for calling the members of the brigade when an outbreak occurred. In regard to the scheme for the erection of working-class dwellings he would like to know what arrangement was made for the water service where baths were provided, and also whether any trade waste was disposed of at the sewage disposal works?

Replying to the various points that had been raised on his paper, Mr. Taylor said the amount mentioned for the upkeep of the council's horses was quite correct. Perhaps one reason for the lowness of the cost of their maintenance was that the oats, which were so expensive just now, were carefully weighed out each week at the depot, and the horses received only the exact amount allowed. Tarred granite was used on the roads because that material was decided upon by the county council, and sand was used for tar-painting because it was cheaper than granite chippings. The cost of the concrete kerbing was greater than the channelling, because more labour was involved in the casting of the channellings. There had been no sinking of the setts outside the channels. The members of the fire brigade were called simultaneously in case of fire by means of electric switches from the fire station. The charge made by the water company for baths was 10s. per bath. The flow at the sewerage works was gauged by a Lea recorder, and lime had been discontinued in the treatment of sludge there owing to the cost. There was a fair amount of trade waste at the works.

At the conclusion of the discussion an adjournment was made to the Bull's Head Hotel for luncheon.

In the afternoon visits were paid to the electricity works, sewage disposal works, public baths and fire station, in the course of which Mr. W. A. Turnbull, the borough electrical engineer, presented certain descriptive notes of his works. Hospitality was dispensed by the chairmen of the Electricity and Sewage Committees at the respective works.

COAL ECONOMY.

APPEAL TO LOCAL AUTHORITIES.

Mr. Hayes Fisher has circularised local authorities throughout the kingdom appealing for support and assistance of the Government's efforts to secure economy in the use of coal. He asks them, in the first instance, to set an example of economy by reducing the consumption of coal, gas and electric light and power in connection with public lighting and all undertakings and premises under their control to the minimum consistent with the necessary requirements of the public services; and secondly, to take every opportunity of impressing upon the public the paramount necessity of following this example. Discussion of the matter at meetings of the councils and at public gatherings might, Mr. Hayes Fisher thinks, prove of value, and further, it is pointed out, attention may with advantage be drawn to methods by which, apart from economy of household fuel, the public can themselves supplement the efforts of the local authority, as, for example, by care in the use of water, which in a great many places has to be pumped either at the waterworks or at the sewage disposal works, or both.

INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS.

BRIDGWATER MEETING PROGRAMME.

The following is the programme of the meeting of the Institution of Municipal and County Engineers to be held at Bridgwater on Saturday, the 14th inst.:—

11.30 a.m.—Reception at the borough police court, by the Mayor and corporation of Bridgwater. General business and discussion of the following paper by Mr. F. Parr, A.M.Inst.C.E., borough surveyor, Bridgwater (chairman of the S.W. District). "Municipal Works in Bridgwater during the Past Twenty-eight Years."

12.45 p.m.—Proceed to the Clarence Hotel for lunch.

1.45 p.m.—Inspection of Messrs. John Board & Co.'s cement works at "Wylds."

3.15 p.m.—Inspection of Castle Fields brickworks, by kind permission of Messrs. Coulthurst, Symons & Co.

4. 0 p.m.—Return to municipal buildings for tea, by kind invitation of Mrs. Parr.

A small charge will be made for brakes to convey members to and from the cement works and brickworks.

The Stanton Ironworks Company, Limited.—This well-known firm of manufacturers of pig-iron and cast-iron pipes, iron founders and colliery owners, have just issued a most useful illustrated pocket catalogue. Among the goods manufactured by the firm, we may mention cylinders for wells and manholes, expansion joints, flanged pipes, gully grates, hydraulic pressure pipes, and manhole covers and surface boxes. The catalogue is printed on art paper, and the illustrations are exceptionally clear. The booklet, which also includes a series of memoranda and useful tables, is of special interest to municipal engineers.

"Safety First."—With a view to obviating a bumper crop of accidents as a result of the further restricted street lighting regulations, the London "Safety First" Council offers the following advice to pedestrians in the streets after dark: (1) Look to the right before crossing the road. (2) Cross the road from a street lamp. (3) Make full use of street refuges. (4) Always face approaching traffic. The council points out that, if all pedestrians kept to the left, instead of to the right, of the footpath on which they are walking, not only would innumerable collisions in the darkness be avoided, but people could not step off the kerb into the road with their backs to oncoming vehicles, one of the chief causes of accident.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Manchester T.C.—The Infirmary Old Site Committee have made an urgent request to the Art Gallery and Libraries Committee for reports as to the area required for the erection of a new art gallery and a new reference library, so as to ensure that the matter could be discussed at a meeting of the former committee.

ROADS AND MATERIALS.

Chard R.D.C.—The council have authorised the acting district surveyor, Mr. Frank Nicholson, to purchase oilskin outfits for all roadmen now employed by them under their new system of direct road maintenance, a step that should be copied by other local authorities that have not already taken it.

Chelmsford R.D.C.—In view of the serious damage done to the main roads, the council are urging the Local Government Board and the Road Board to rigorously enforce upon all heavy lorries the regulation as to the limit of 12 miles an hour.

East Barnet U.D.C.—The surveyor, Mr. H. York, has received instructions to take such steps as might be necessary to cut back all trees and shrubs overhanging the public ways so as to cause obstruction.

East Grinstead U.D.C.—A letter was read from the county council stating that as from April 1, 1918, the tar surface treatment of main roads in urban districts would be treated as maintenance and repair, towards which the county council would contribute the usual 90 per cent and 50 per cent of the cost, provided urban authorities, before the work was commenced, submitted an estimate of the area proposed to be tarred and the cost. Mr. Dixon said he was glad to see that the county council had at last arrived at the decision mentioned in their letter. It had been a great fight with the urban authorities, but at last the county council, on the irrefutable evidence which urban bodies were able to bring before them, had come to a proper decision. The chairman said it had been a good fight, and they must compliment the surveyor (Mr. W. E. Woollam) and others on the way they had stuck to their posts. He was glad the county council had at last come to their senses.

Hinckley R.D.C.—A letter was read from the War Agricultural Executive Committee pointing out there was a great shortage of drivers for thrashing machines, and asking if the council could not follow the example of other councils by liberating their driver for the purpose. Mr. Hands: If we had a surveyor we might do something, but Mr. Allsop is acting at present both as steam roller driver and surveyor. Mr. Powers said the War Agricultural Committee were hardly consistent. They ought to allow tribunals to exempt all thrashing tackle men, but instead they tried to get as many for the Army as possible; in fact, they had tried to get seven of his men only reeently, with the result that he had removed them into other counties. The clerk was instructed to write that there was no one available.

Liskeard R.D.C.—The proposal to invest a further sum of £2,000 in War Loan for expenditure on the roads after the war raised a discussion as to the policy of setting aside money for such a purpose. On the one hand it was contended that it was wise finance to provide for the time when an enormous sum would have to be spent on the roads, while on the other hand it was maintained that it was not fair to make a call for money that was not required at the present time. The council decided to reduce the proposed rate from 10d. to 8d., but it was explained that this would still allow of £2,000 being invested as recommended.

Manchester T.C.—The Town Planning Committee, with the assistance of the city surveyor, have been engaged for several years past in considering schemes for the development of certain areas of the city, particularly on the southern side, and among the schemes proposed is one for the construction of a new road from Oldham to Bolton. Plans in connection with town-planning schemes have been prepared for the Local Government Board.

Orsett R.D.C.—The chairman of the council and the surveyor (Mr. F. T. Johnson) have been deputed to inspect one of a new pattern of tarring machines, with a view to purchase.

Perthshire C.C.—At the last meeting the surveyor reported that nearly all main and secondary roads had been damaged by heavy timber haulage.

Saffron Walden R.D.C.—At the last meeting the surveyor reported that now farmers are paying 32s. a week to their labourers he is unable to get any men to work on the roads.

SEWERAGE AND SEWAGE DISPOSAL.

Abercarn U.D.C.—The council have applied to the Local Government Board for sanction to construct a sewer to serve 110 houses. The surveyor, Mr. J. Williams, estimated the cost of the work in 1916 at £2,333, but he now stated that the cost would be £3,000.

Crompton U.D.C.—It was reported that the Local Government Board had sanctioned the borrowing of £7,693 on account of the excess expenditure on the sewage works—£883 for machinery for ten years, and £6,810 for buildings, &c., for twenty-five years. The council decided to accept the terms offered by the Public Works Loan Board for lending the money. A letter was submitted from the Loan Board to the effect that the rate of interest charged on guaranteed loans on the security of local rates was 5½ per cent per annum. The rate of interest would remain in operation throughout the whole period of currency of the loan.

WATER, GAS, AND ELECTRICITY.

Carnforth U.D.C.—A scheme has been submitted for the improvement of the gas plant.

Eastbourne T.C.—It was reported that the profit on the electricity undertaking last year was £4,773, as against £800 for the previous year.

Lymington T.C.—The tender of Messrs. Isler & Co., at £120, has been accepted for remedying the defects at the second borehole at Ampress. With other necessary works it is expected that the total cost will be £300.

Rawmarsh U.D.C.—A proposal has been approved for the repair of one of the gasholders, at an estimated cost of £2,500.

Rotherham R.D.C.—Application is to be made to the Government Department concerned for permission to obtain the necessary materials for the erection of a storage tank for the purpose of the Maltby water supply.

Southam R.D.C.—For the improvement of the Stockton water supply the council are considering the deepening of the public wells.

Stratford-on-Avon R.D.C.—Messrs. Willcox & Raikes have been engaged to inspect the artesian well at Alveston, with a view to putting down a pumping plant.

Wantage U.D.C.—The council propose to erect a new gasholder and instal sulphate of ammonia plant at the gasworks.

Weardale R.D.C.—A committee has submitted a report in favour of bringing water from Cote House, at an estimated cost of £500.

Wem R.D.C.—An offer by the owner of the Clive waterworks for the sale of the undertaking to the council for £600 has been referred to the parish council in conference with a committee of the council.

Widnes T.C.—Owing to the increasing demands for water, due to the industrial development of the town, it has been found necessary to sink another well at Delb Vale, close to Gateacre Station. A few months ago the town council sanctioned a temporary scheme put forward by the gas and water engineer, Mr. Isaac Cann, for the erection of a new pumping station for the delivery of an additional supply of 1,000,000 gallons daily. When the overflow scheme is completed the additional supply will be 3,000,000 gallons daily. The work, which is now proceeding, is estimated to cost £20,000.

MISCELLANEOUS.

Darton U.D.C.—The surveyor, Mr. S. Wilkinson, reported that the Horse Committee had purchased a horse for £100.

Glasgow T.C.—A sub-committee is considering the purchase of two new motor pumps for the fire brigade.

Plympton R.D.C.—The salary of the surveyor for the north district has been increased from £170 to £220 a year.

Rhyl U.D.C.—The engineer, Mr. A. A. Goodall, reported that during July 1,098 loads of drift sand were removed from the promenade and parade roadways. A way for pedestrians had been made and maintained from Marine-drive into Conwy-street. A good supply of marram grass being now available from the land recently purchased at Foryd, a considerable area of the sandhills had been planted. A new concrete apron had been constructed to protect the pitched slope to the promenade wall west of Sandringham-avenue, and a start made with the construction of groynes to protect that part of the foreshore. On the east boundary of the district a portion of the groyne had been washed away, and considerable damage caused to

other groynes in the vicinity. Before the winter season set in work of reconstruction would have to have precedence over all other work. The difficulty of obtaining labour was more acute than ever owing to the comb-out of men between forty and fifty years of age, and the council decided to refer this matter to the local tribunal.

LOCAL GOVERNMENT BOARD INQUIRIES.

The Editor invites the co-operation of Surveyor *readers with a view to making the informaton given under this head as complete and accurate as possible.*

APPLICATIONS FOR LOANS.

Hull T.C.—£1,165 for an electric tipping van.

Middleton T.C.—£7,500 for new cable, plant, and alterations at the electricity works.

PERSONAL.

Mr S. F. A. Pratt, borough surveyor of Henley, has been appointed local coal overseer.

Mr. Percival T. Harrison, borough surveyor and water engineer of Chelmsford, has been appointed local fuel overseer.

Mr. C. A. Haynes, surveyor to the Millom Urban District Council, has been appointed local fuel overseer at a salary of £100 a year.

Mr. Frank Nicholson, acting district surveyor to the Chard Rural District Council, has had his salary and travelling allowance increased from £250 to £320 a year, with an additional £50 bonus to meet past expenses. He has also been allowed a clerk assistant.

OBITUARY.

Mr. John Smith, head of the firm of William Smith and Sons, sanitary implement makers, Barnard Castle, died on Saturday at his residence, Grove Park, at the age of seventy-eight. Mr. Smith was a magistrate for the North Riding of Yorkshire and for Durham County, a trustee of the Bowes Museum, chairman of the Teesdale Board of Guardians, and chairman of the Barnard Castle Urban District Council.

Edinburgh's New Town-planning Scheme.—Edinburgh Town Council have resolved to apply to the Local Government Board for authority to prepare a town-planning scheme to embrace portions of the Broughton, Inverleith, Wardie, Granton, and Craigleith districts. The area lies partly in the city, partly in Leith, and partly in the county.

South Wales Sanitary Inspectors.—The annual meeting of the South Wales and Monmouthshire Centre of the Sanitary Inspectors' Association was held on Saturday at Cardiff, under the presidency of Mr. B. Lewis, of Aberdare. Sir Alfred Bond, M.P., was re-elected president, and the report submitted by the secretary, Mr. J. Towy Thomas, Rhondda, showed a membership of eighty-six. It was reported that during the year there had been an increase of two in the roll of honour, and that sixteen members were now engaged on active service.

German Prisoners on the Roads.—The Right Hon. the Speaker, at the meeting of the East Suffolk County Council last week, having stated that he had heard complaints of the difficulty of getting German prisoners on the roads to work, the county surveyor (Mr. W. Jervis) said there were no prisoners on main roads, except where work was being carried out under military requisition, and the payment of those prisoners was a matter between the War Department and the Road Board. He believed they were paid something like 1½d. an hour, but he was not certain. There were good workers among them, and others who were inclined to slack. There was a good deal depending on the person who had charge of them. These men seemed to treat a civilian as having no authority at all. He had tried to make arrangements for the supervision of the labour, and there had been a certain amount of improvement.

County Council and Damage to Main Roads.—At Bangor County Court on Monday, Judge Bryn Roberts delivered judgment in an action in which the Carnarvonshire County Council sued Messrs. Green & Co., timber merchants, Conway Valley, for £160 damages, alleged to have been done to main roads in the county by extraordinary traffic in connection with the defendants' business in the county. The case was heard by the late Judge Moss, who died before delivering judgment, and the parties agreed that Judge Bryn Roberts should decide the case on Judge Moss's notes, plus statements by the solicitors on each side. Judge Bryn Roberts heard these at the last court, and reserved judgment. The Judge now said that he had come to the conclusion that there was extraordinary traffic, exceptional in amount and concentrated during a comparatively short period, and that this had caused a substantial increase in the burden cast on the road, which had caused increase in the cost of upkeep. He gave judgment for the plaintiffs for £120 and costs.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is it a fact, as recently stated, that gas can be sold at 12s. 3d. per 1,000 cub. ft., and still be equal, for heating purposes, to electricity at 1d. per unit? If this is so, will it not be a long time before electricity can be universally applied for heating as well as lighting? If this statement is incorrect, will some reader of these "Things One Would Like to Know" enlighten the writer on the subject and give him some plain facts and figures as to what are the real thermal values of these two commodities?

* * * *

Does not the display arranged by the Gas Traction Committee, at the exhibition by the British Science Guild, at King's College, London, show what can be done with gas as a substitute for petrol for motor vehicles, and is it not evident that the use of gas in this connection will continue after the war, unless the price of petrol comes down with a run? Is not the whole exhibition worth a careful inspection by any one interested in the progress of science in this country?

* * * *

What is wrong at Okehampton, Devonshire, when we learn from a local paper that a cartage contractor has threatened the rural council that he will send in an account for damages caused by delay to his steam-wagons, owing to the condition of the roads, and has accused the council of "slackness and doziness"? Is the latter word to be found in any dictionary, and is it equal to being "sleepy-headed;" or what is the translation? But what we should like to know is, what is this council going to do to improve their roads, if they are as bad as is suggested?

* * * *

Was it not rather ungracious of an Alderman of the City Council of Sheffield to carp at the proposal that the Imperial Government should pay some remuneration to their able and energetic surveyor, Mr. Hadfield, for the extra duties imposed on him by his appointment as fuel overseer for the district? Is it not unreasonable to expect such officials to execute any amount of extra work without adequate remuneration? Is it not just these criticisms that make the work of such municipal officials so unpleasant and harassing at times?

* * * *

Is it not rather remarkable, as shown in Mr. J. D. Haworth's letter in The Surveyor of August 16th, that the only general regulation with regard to shop-window blinds is in the old Towns Public Clauses Act, 1847, and that this only refers to the height, and not to the extent of projection? Would it not be interesting to know what by-laws or regulations have been framed in more recent times with regard to these obstructions—for surely the width of projection is of as much importanee as the height—and do not these shop-window blinds in some cases project so far that they become a danger to the vehicular traffic? Is it not to be hoped that local surveyors will respond to Mr. Haworth's appeal for correspondence on the matter?

* * * *

Is it not a grievous pity, as pointed out in a discussion on the utilisation of the water power in this country at the British Scientific Products Exhibition, at King's College the other day, that the blame for the non-use of such power lay largely with the owners of land and our own Government departments? Is it not regrettable that enterprise and progress are perpetually thwarted by legal pitfalls and the barbed wire entanglements of so-called vested interests?

Scavengers' £3 a Week.—The wages of scavengers employed by the Blaenavon Urban District Council have been increased to £3 per week.

Sewage Disposal Schemes for Shanghai and Hankow.—The municipal authorities of Shanghai and Hankow have, it is stated, requested Prof. Fowler, formerly of Manchester, to advise them on sewage disposal schemes.

Municipal Engineering Work at Lincoln.—In his report for the year ended March last, Mr. R. A. MacBrair, M.Inst.C.E., the city engineer and surveyor, mentions that in consequence of the greatly reduced amount of street lighting in Lincoln, kerbing, trees, lamp-posts and corners of buildings were again lime-whited. Road-rolling and tar-spraying were done along various roads for the military authorities, and the tar-sprayer was lent to the Road Board and the Welton Rural District Council. The men attending upon one of the steam rollers have gone to the war, and therefore only one roller can now be used at the same time. The two rollers were at work on the public roads on 252 days, and on private roads ten days. A beginning was made at collecting waste paper, but it was found that large establishments had already made their own arrangements. Munition traffic damaged very greatly some of the roads, and claims were made for these roads, which have been paid to a certain extent. Mr. MacBrair adds that a great deal of carting has been done in fetching horse-food which previously was brought in by the sellers.

PAINTS AND BRUSHES.

GAMMON AND SMITH'S PRODUCTS.

Improved forms of manufacture which supersede old-fashioned and expensive ideas are always interesting, and especially so when relating to any department of the building trades. Messrs. Gammon & Smith, Petersfield, Hants, have placed on the market a non-corrosive paint which they are selling under the title of "Everlasting," which appears in every way to be strikingly applicable. The main feature of this paint, in addition to being non-corrosive, is that it is not affected by sea water alternating with air, which to municipal engineers and surveyors in seaside towns should prove invaluable. It is interesting to note that besides resisting atmospheric conditions it will also prove adamant to any chemical action that may be set up on account of brine, acids, fumes and gases from any source. Another striking feature is that it will protect wood from severe heat, and that sparks and cinders from locomotives will not ignite the substance. Moreover, it contracts and expands without the least danger of cracking, scaling or peeling. Economy is certainly a byword with users of the "Everlasting" paint, as its covering qualities range from 400 sq. ft. to 500 sq. ft. per gallon, at an exceedingly low initial cost. The paint is composed of a pigment that is imperishable in itself. Many other pigments compose a good paint, but the great problem has been to find a binder for these imperishable pigments that would be, in a measure, almost as durable as the pigments themselves. Messrs. Gammon & Smith venture the statement that their paint, when properly applied, will last ten years under normal conditions on iron, steel or wood. It may be asked if there is any special form of application; all that is required is exactly the same preparation as would be undertaken for any paintwork. It is being extensively used by the leading municipalities, gas companies, tram companies, shipbuilders and manufacturing authorities, &c.

Messrs. Gammon & Smith have also placed on the market as a collateral item a patent broom and brush, which is made to suit innumerable purposes, among others scavenging, tarring, limewashing, painting, tramway point cleaning and sanitary work. The life of the whole of these brushes is only determined by wear. There is no cement used in the fixing. The bristles are attached to an iron hook which holds exactly half the material either side of it, and is then closed up and bound with wire. The majority of the patterns only require the actual wearing parts renewed when worn out, which of a necessity are made from the finest materials obtainable. The whole of the brooms or brushes can be immersed in any liquid without deterioration.

We understand from Messrs. Gammon & Smith that they will be pleased to forward catalogues and prices on receipt of application.

Association of Managers of Sewage Disposal Works. — A meeting of the Metropolitan District of this association will be held at the sewage farm and disposal works of the Romford Urban District Council and the Romford Rural District Council respectively, on Saturday, September 14th, at 2 p.m. The members will first visit the rural district council's sewage works, under the guidance of Mr. G. J. Carter, acting surveyor, and Mr. Thos. Flucker, superintendent. The urban district council sewage farm will be inspected under the guidance of Mr. J. Craig, manager, who has kindly consented to read a paper, entitled "An Introduction to the Philosophy of Sewage Irrigation."

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

HOUSING AND TOWN PLANNING ASSISTANT.—September 10th.—Southgate Urban District Council.—Mr. D. S. Sutherland, engineer and surveyor, Town Hall, Palmer's Green, N. 13.

INSPECTOR OF NUISANCES.—September 10th.—Horsham Urban District Council. £170 a year.—Mr. S. Mitchell, clerk, Council Offices, Horsham, Sussex.

TEMPORARY ENGINEERING ASSISTANT.—September 16th.—Barrow Town Council.—Mr. W. C. Persey, borough engineer and surveyor, Town Hall, Barrow-in-Furness.

HOUSING ASSISTANT.—September 16th.—Hemel Hempsted Town Council.—Mr. Walter R. Locke, Town Hall, Hemel Hempsted.

ENGINEERING AND SURVEYING ASSISTANT.—September 21st.—Swansea Town Council. £250 a year.—Mr. J. Richard Heath, borough engineer and surveyor, Swansea.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

GLOUCESTER.—September 9th.—For the erection of a pavilion of twelve additional beds at the tuberculosis block of the Oban hospital.—City Surveyor, Guildhall, Gloucester.

CORNWALL.—September 16th.—Erection of a new pavilion at Tehidy Sanatorium.—Mr. E. H. Crispin, architect, County Hall, Truro.

Engineering: Iron and Steel.

ATHERTON.—September 16th.—Supply of two 110-kw. single-phase transformers.—Mr. B. Darby, resident electrical engineer, Atherton, Lancs.

MADRAS.—For the supply of sewage pumping machinery, consisting of oil engines or gas engines, and centrifugal pumps, pipes, accessories, &c.—Messrs. James Mansergh & Sons, civil engineers, 5 Victoria-street, Westminster, S.W. 1.

BURLEY AND MENSTON.—The Joint Sewerage Board are offering for sale two complete suction-gas producers.—Mr. Harry Riding, engineer and surveyor, Council Offices, Menston, near Leeds.

CAERPHILLY.—The urban council offer for sale a Merryweather's improved sliding carriage telescopic fire escape.—Mr. T. H. Richards, Council Offices, Caerphilly.

Roads.

DUNMOW.—September 10th.—For the hire of a steam roller.—Mr. A. E. Floyd, clerk, Rural Council Offices, Dunmow, Essex.

BRAINTREE.—September 11th.—For the supply of 600 tons of broken granite.—Mr. H. H. Nankivell, surveyor, Vestry Hall, Braintree, Essex.

EDMONTON.—September 16th.—Supply of broken granite and Portland cement.—The Engineer. Urban Council Offices, Edmonton.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

SEPTEMBER.

14.—Institution of Municipal and County Engineers: Meeting at Bridgwater.
14.—Association of Managers of Sewage Disposal Works: Meeting at Romford. 2 p.m.
20-21.—Institution of Municipal and County Engineers: Meeting at Middlesbrough.
27-28.—Institution of Municipal and County Engineers: Meeting at Penarth and Barry.

APPOINTMENTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

COUNTY BOROUGH OF BARROW-IN-FURNESS.
TEMPORARY ENGINEERING ASSISTANT.

Wanted, in the Borough Engineer and Surveyor's Office, a temporary Engineering Assistant (ineligible for Military Service).

Applications, in candidate's own handwriting, stating age and salary required, and giving full particulars as to experience, and accompanied by copies of not more than three recent testimonials, to be sent to the undersigned, not later than Monday, 16th September, 1918.

Canvassing will disqualify.

W. C. PERSEY,
Borough Engineer and Surveyor.

Borough Engineer and Surveyor's Office,
Town Hall, Barrow-in-Furness.
August 22, 1918. (3,858)

BOROUGH OF HEMEL HEMPSTED.
HOUSING ASSISTANT.

A competent whole-time Assistant required to prepare Surveys, Plans, Estimates and Quantities for a large Housing Scheme.

Applications, with copies of three recent testimonials, stating salary required, to be sent to the undersigned not later than September 16th.

WALTER R. LOCKE.

Town Hall,
Hemel Hempsted.
September 4, 1918. (3,864)

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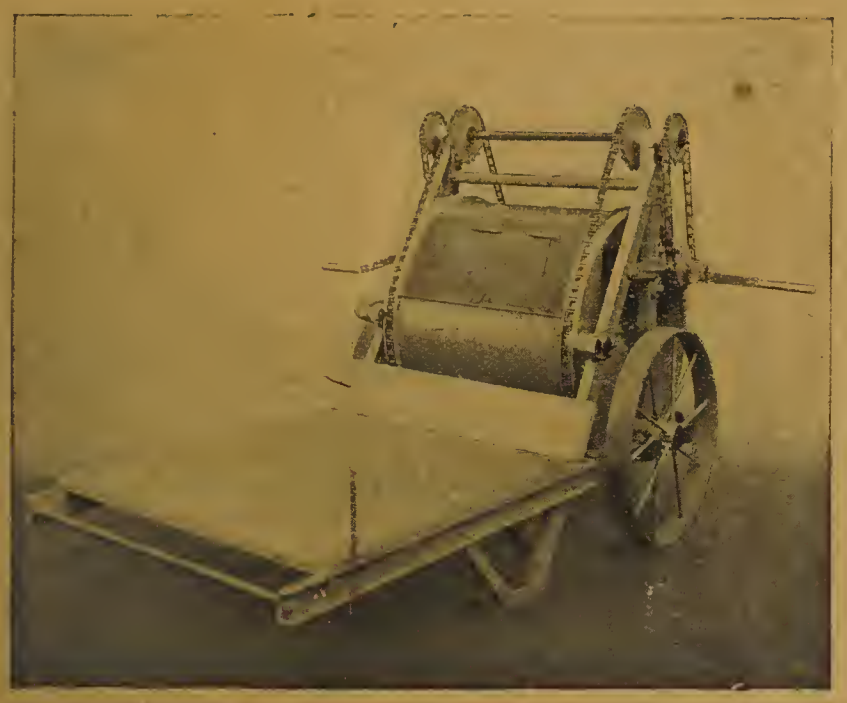

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Fig. 106

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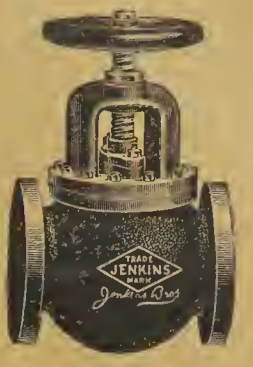
Fig. 142



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REINFORCE CONCRETE ROADS WITH

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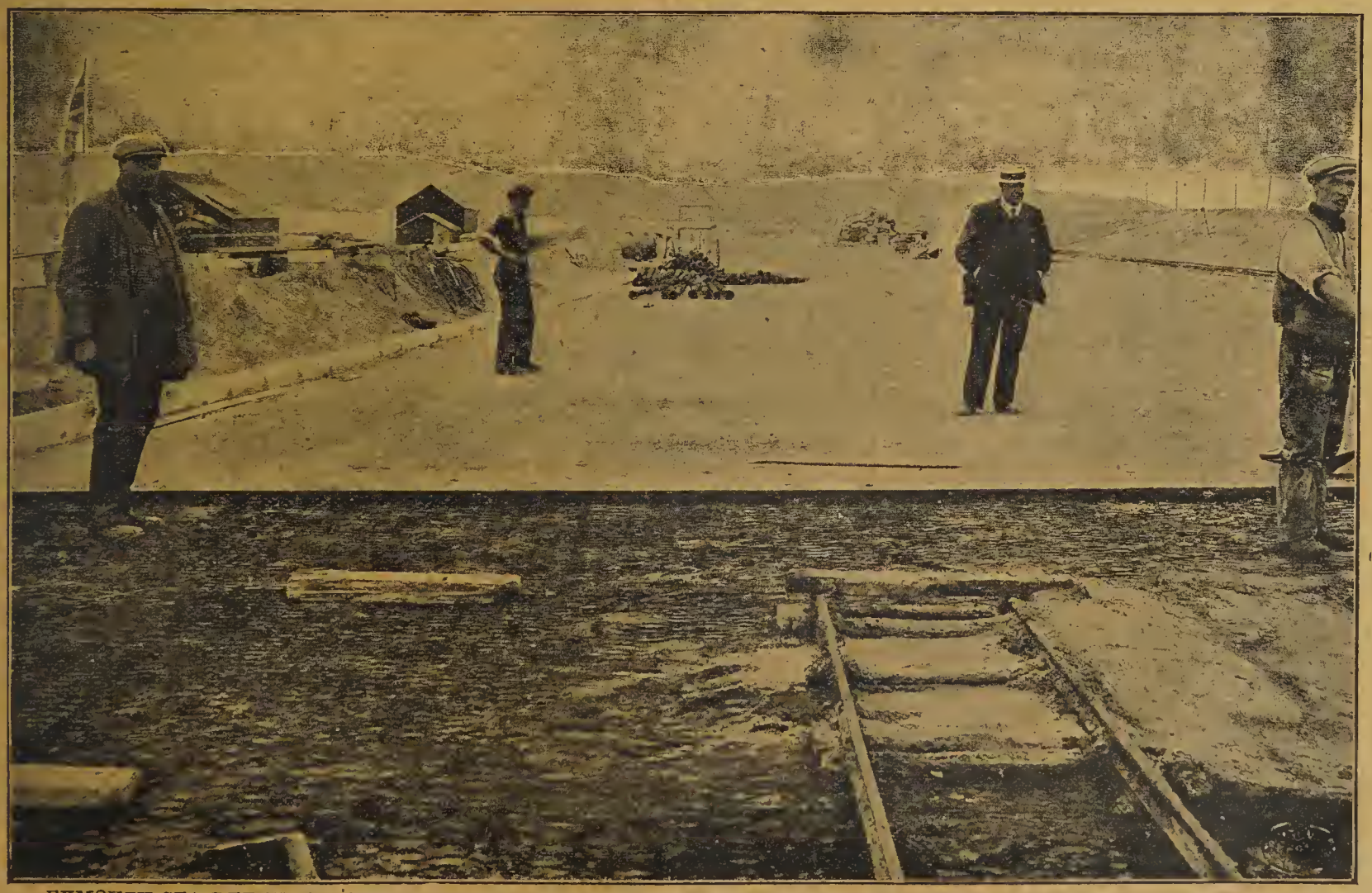

EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet.
Mr. SAMUEL HUTTON, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED

(Patentees and Manufacturers of Expanded Metal).

Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.

Works: STRANTON WORKS, WEST HARTLEPOOL.

COUNTY BOROUGH OF SWANSEA.

TEMPORARY ENGINEERING AND SURVEYING ASSISTANT.

The Corporation invite applications for the appointment of Temporary Engineering and Surveying Assistant in the Borough Engineer's Department.

Candidates must be first-rate Surveyors, and must have had considerable levelling experience, and be neat and expeditious draughtsmen. Salary at the rate of £250 per annum.

Applications, stating age, present occupation and previous experience, accompanied by three recent testimonials, to be sent not later than Saturday, 21st September, 1918, to—

G. RICHARD HEATH.
Borough Engineer and Surveyor,
Guildhall,
Swansea.

September 3, 1918. (3,863)

PREPARATION FOR EXAMINATIONS.

COMPLETE COURSES OF PREPARATION for the Examinations of THE SURVEYORS' INSTITUTION, THE INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS, &c., are conducted by Messrs. PARRY, BLAKE & PARRY, who will be pleased to send full particulars or to give any advice with respect to the Examinations.

Address: 82 Victoria-street, S.W. 1. Telephone: Victoria 6680.

COMPLETE COURSES for the Examinations of the Surveyors' Institution, Institution of Civil Engineers, Municipal and County Engineers, Institution of Municipal Engineers, R.I.B.A., R.SAN.I., Ferro-Concrete, Practical Mathematics, Strength of Materials.

PENNINGTONS,
254 Oxford-road, Manchester,
from whom obtain all particulars and advice.

Chief Offices:—352 to 364 Euston Road, London, N.W. 1.
Telegrams: "Courteous, Eusroad, London." Telephone No.: Museum 3032 (5 lines.)

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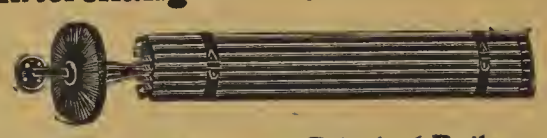

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Vol. LIV. SEPTEMBER 13, 1918. No. 1,391.

Minutes of Proceedings.

The Road Board.

Anyone who is desirous of forming an accurate estimate of the effect of the war on highway administration cannot do better than turn to the eighth annual report of the Road Board, which has just been published. Unfortunately, no accurate figures are available of the annual revenue expenditure on roads in England and Wales during the war; but the practical assertion of the normal activities of the Road Board itself is only an example of the policy of "economy" which has been generally necessary in the national interest. Dealing first with the normal work of the board during 1917-18, it must be remembered that since 1915, when it was decided to retain the proceeds of the Petrol and Carriage Duties in the Exchequer, the sole source of income has been profit and interest on investments and loans. It is hardly surprising, therefore, to find a continued shrinkage in the amounts paid in grants and loans, the former being £109,000 and the latter £34,000 less than in the preceding year. Even with its reduced income, however, the board continues to save money, as with an income of £173,000 for the year the nett payments, after deducting loans repaid, only amounted to rather less than £88,000. The report calls attention to the continued deterioration of the roads owing to the shortage of labour and materials on the one hand, and the increase of heavy motor traffic directly and indirectly connected with military movements on a large mileage of roads on the other; and reference is made to the useful work accomplished by the Road Stone Control Committee in regulating the supply and transport of road materials. The attention of the board during the year under review has, however, been chiefly occupied in carrying out special tasks at the request of various Government departments, and in particular they have continued the special work which they undertook after the outbreak of war at the request of the Army Council—namely: (1) To supervise and arrange for the construction and maintenance of new roads, and the improvement of certain private roads in several districts for military purposes in connection with camps and otherwise, and to carry out such work, where required, by direct labour; (2) to arrange with highway authorities for improvements on public roads, mainly at the cost of the Army Council, required for military purposes, and to supervise, or to carry out by direct labour, the execution of the improvements; (3) to settle by negotiation with highway authorities the amounts payable by the Army Council in respect of damage caused by extraordinary traffic in connection with military purposes. Similar work has, with Treasury approval, been undertaken for the Admiralty, Ministry of Munitions, and Timber Supply Department of the Board of Trade, and more recently for the Air Ministry. In this connection works to the value of over two millions sterling have been carried out by or under the supervision of the board during the year. Among the appendices are the reports of the board on the Western Avenue and North Circular road recommended by the London Arterial Road Conferences, and we hope to refer to these next week.

* * * *

Housing and Reconstruction.

The second of the pamphlets on Reconstruction Problems that are being issued by Dr. Addison's department deals with the important question of Housing in England and Wales. Most of the ground covered by the pamphlet is already familiar to our readers, as we have called attention to the various committees as they were appointed, and to the several reports and Government decisions as they were made public. The present booklet, however, is not intended for the expert, but rather for the ordinary citizen who desires to inform himself as to the extent of the need for house building after the war and as to the steps that are being taken by the Government to meet that need. Although the war cannot be held responsible for the existence of a housing problem, it has rendered extraordinarily urgent a state of affairs that was already serious. This result has been brought about by a practical suspension of building, including work in connection with the closing and repairing of unfit houses and the clearing of slums; by a large increase both in the cost of building and the price of money; and by a general shortage of all building materials. We are accustomed to think of housing as a question of public health, and this is right. But indirectly good housing is an important factor making for industrial contentment. In this connection it is pointed out that last year a Royal Commission was appointed to inquire into the causes of industrial unrest. For this purpose Great Britain was divided into eight areas, each of which was allotted for the purposes of the inquiry to a separate committee. In seven out of the eight reports attention was specifically drawn to the fact of insufficient and bad housing being a cause of unrest. Hope for a speedy after-war solution of the problem lies chiefly in the response of the local authorities to the appeal of the Government to have plans ready, and in the fact that the work will very largely be independent of shipping, as building materials can be produced almost entirely in this country. It is true that there will be a shortage of timber, but experiments are now being made for reducing to a minimum the quantity of timber used in the building of cottages. Finally, it must be remembered that the prompt undertaking of the Government housing scheme will provide the largest single contribution to the problem of unemployment on demobilisation. We would suggest that copies of this pamphlet might with advantage be sent to the clerks of all local authorities which have as yet made no return in reply to the Local Government Board's circular, with an instruction to distribute them among the members.

* * * *

Local Authorities and the Disabled.

General sympathy will be felt, both by the members of local authorities and their officers, with the appeal that has been made by the Local Government Board for the employment as far as possible in the local public services of discharged disabled officers and men. The matter is one in which the board are concerned in conjunction with the Ministry of Labour and the Ministry of Pensions; and it is the desire both of Mr. Hayes Fisher and Mr. Hodge that there shall be similar co-operation between the local authorities and the local Pensions Committees. To this end a circular has been issued by the Minister of Pensions containing suggestions for a practical working scheme, and resolutions have already been passed by the Associations of Municipal Corporations, Urban and Rural District Councils recognising the special claims of men disabled by war service to employment in the public service, and expressing approval of the principle that such men should be given preference subject, of course, to the reinstatement of former employees. The plan suggested by the Ministry of Pensions for giving effect to these resolutions is of a two-fold character. In the first place it is proposed that for clerical and manual whole-time posts preference should be given for a definite period and for as long as possible after the termination of the war, so as to cover the full period of demobilisation and the subsequent resettlement to normal conditions. The second part of the plan relates to posts involving only light unskilled work, or part-time work, such as that of park and gate keepers, caretakers or watchmen; and it is suggested that a preference should be given to disabled men for this class of work for an indefinite period. Arrangements are being made through the Local Pensions Committee for training men for posts which require special qualifications; but it is made clear

by the scheme that it does not apply to posts requiring superior administrative experience and capacity or professional and higher technical qualifications.

* * * *

Government Building Contracts.

The letter to the *Times* to which we called attention in our last issue has, we are glad to see, attracted considerable attention. For example, in the course of a recent prosecution of a firm of builders' merchants for selling bricks "otherwise than in the terms of a permit issued under the authority of the Minister of Munitions"—in other words, at an excessive price—the presiding magistrate referred to the latter, and observed that it did not matter to a Government contractor how much he paid for material or labour as he was paid by commission on the cost price of the work. Indeed, the higher the cost, the better for the contractor. Another correspondent of the *Times* has pointed out that the matter is obviously too involved to be dealt with effectively by correspondence in the Press, but a committee of inquiry, drawn from the heads of Government departments, architects, quantity surveyors, and contractors who have had experience in carrying out works under both systems during the war, assisted by one or more of the leading barristers who specialise in cases relating to building contracts, should have beneficial results. He suggests that, if such an inquiry be considered advisable, its scope should not be limited to merely "lump sum *v.* percentage contracts," but to the general procedure under which building contracts are being dealt with to-day, and that any contractor who has carried out work for Government departments under both systems during the war should, if he so desires, have an opportunity of giving evidence before the committee.

* * * *

A Use for Roadside Timber.

A word in season appears in a letter published by the *Times* from Mr. U. Lambert, Blechingley, Surrey, on the question of roadside timber. If it were not that we are specially grateful to the hedges just now for their harvest of blackberries, something might also be said about these in connection with the subject of roads. This apart, however, Mr. Lambert is not far out when he states that only road surveyors probably know what roadside timber costs the rates in repairs every year at the same spots, where roads rarely dry because of overhanging trees. A great deal of this timber is old; much of it is mutilated and unsightly, and it would be a merciful relief alike to the roads and the rates if it were felled as soon as the leaf is off and made available for fuel. As Mr. Lambert remarks, every surveyor could point out hundreds of trees in his district which might be made useful for firewood and thus make up to some extent for the shortage of coal with which we are now faced. Londoners would be rendering a public service if they co-operated in a scheme for felling much of this roadside timber, and surveyors, we feel sure, would be only too willing to assist a proposal which is so charged with economic possibilities.

CONCRETE ROADS.

AN AMERICAN ASSOCIATION'S PAMPHLET.

We have been favoured with a copy of a pamphlet on "The Development of Concrete Road Construction," recently issued by the Portland Cement Association of Chicago. This pamphlet is written by Mr. A. N. Johnson, consulting engineer to the association; it is taken from the T. E. Alfred lectures on engineering practice at the Johns Hopkins University, and is a most excellent treatise on this interesting subject.

The author points out that the growth of motor traffic on the roads has been phenomenal, and that "with vehicles of greatly increased weights, with self-contained motor-power, moving at seven to ten times the velocity of heavy horse-drawn traffic, it is not to be wondered that many of the older types of highway surfaces have proven themselves to be utterly incapable of the service which they are now called upon to perform"; also that only three types of surface which afford the utmost rigidity and resistance to displacement can meet the requirements. Of these types he considers that concrete is one that meets these requirements. He gives a table in which he shows the growth of concrete roads in the United States since the year 1909—when there was a total of only 591,416 sq. yds.—up to the year 1917, when this had grown to no less a figure than 96,718,868 sq. yds. of concrete roads, streets and alleys constructed of this material. He points out the low cost as compared with other types at which concrete roads can be constructed and maintained, also the widely dispersed and common occurrence of the materials of which concrete can be made, and that such roads can be constructed without the employment of "peculiarly skilled labourers;" further, that it possesses an even surface affording a low tractive resistance combined with such a surface texture as affords a good grip for the wheels of fast-moving traffic, and thus reduces the dangers of skidding. He then enters into considerable detail with regard to width, which is a subject that might well be more scientifically considered than it is at present, and he also discusses such questions as thickness, drainage, grading, haunches, quality of materials to be used, proportions of materials, handling of the materials, mixing the concrete, placing it *in situ*, expansion joints, finishing the surface, maintenance and repairs, and also the causes of and the cures for cracks.

This pamphlet is one of the best treatises on concrete road construction that has yet been issued, and should be studied by everyone interested in the question of the construction of concrete roads. It is rather remarkable that, whereas in the United States of America and also in Canada there have been so many millions of square yards of roads and streets constructed of concrete, in this country there has hitherto been constructed only a few thousand square yards of such roads. It is a little difficult to give a reason for this; but no doubt the great obstacle in this country to this form of construction is the question of the diversion of the traffic during the somewhat long period that concrete takes to set properly. This and the excellent manner in which roads are now made with bituminous binding and bituminous mixtures no doubt tend to make our road engineers a little shy of entering into a form of construction with which they have no experience.

LONDON'S ARTERIES.

THE WESTERN AVENUE AND NORTH CIRCULAR ROAD SCHEMES.

At the request of the President of the Local Government Board the Road Board have made an investigation of the various schemes proposed by the London Arterial Road Conferences of 1913-15, and their views on the suggested Western Avenue and the North Circular Road are given in their eighth annual report, issued on Friday last.

According to the final proposal of the conference, the Western Avenue, which was recommended as a new arterial road to the west for the relief of the Oxford road, would be an almost entirely new road, over 15 miles long, running roughly midway between the Harrow and Oxford roads. The board, after a detailed examination of the scheme, state that the traffic on the Oxford and Harrow roads has not yet reached such a degree of intensity as to require the immediate construction of the avenue at the cost of public funds, "but the growing traffic cannot be provided for by widening the existing roads, which moreover would be so costly a proceeding as to be regarded as impracticable." Nor would it be practicable by improving and linking up existing roads to provide an additional artery. The entire area east of Uxbridge-Rickmansworth enclosed by the Oxford and Harrow roads, roughly 60 square miles, requires to be dealt with more or less as a unit, and in order to secure this unity the twenty-three authorities now responsible for the administration of the area need to be associated in a representative organisation. The construction of the avenue would ultimately involve an expenditure considerably over a million sterling. The provision of secondary roads and improvements to other roads within the area to secure the necessary junctions may involve the expenditure of another million pounds. The bulk of the expenditure should, in the opinion of the Road Board, be recovered from the landowners as their estates are developed for building purposes. Until the more pressing and important needs of road crust improvements throughout the country have been met, the board will not be able out of the funds at their disposal to grant any substantial sums to schemes like the Western Avenue. The first step towards any practical action is to prepare a detailed scheme of the road requirements of the area considered as a unit and to determine the ultimate complete cost of the scheme. A careful engineering survey and the preparation of plans and estimates may involve an expenditure of, say, £5,000. The board express their willingness to undertake this duty and expenditure at the cost of the Road Improvement Fund.

The board consider that, for the purposes of a ring road intersecting all the radial roads, and thereby enabling traffic approaching London from the country to switch from one main road to another without entering the metropolis, the proposed North Circular road is too near London. In their opinion, the purposes of a ring road would be better secured by the improvement of the outer North Circular road that already exists at a radius of 20 miles from Blackfriars bridge, on the line Staines-Rickmansworth-Watford-St. Albans-Ware-Harlow-Brentwood-Tilbury.

City of London Improvements.—A report issued by the Public Health Department of the City Corporation states that the outlay on improvements last year was only £2,890, consequent on the practical cessation of all street widenings.

Local Authorities and Housing.

SCOTTISH LOCAL GOVERNMENT BOARD MEMORANDUM: FIVE TYPE PLANS.

The Local Government Board for Scotland have issued a memorandum with suggestions in regard to the provision and planning of houses for the working classes. The object of the memorandum is to furnish information, suggestions and plans which it is hoped will be of assistance to local authorities in their consideration of the various essentials of a post-war housing scheme. The suggestions set forth in the memorandum are largely the outcome of the experience gained by the board's staff during the past two or three years in connection with the erection on behalf of various Government departments of a great number of houses for war workers. As a matter of fact, many hundreds of houses similar to those which are illustrated have been erected directly by or indirectly under the ægis of the board during the last two or three years. The memorandum is intended to indicate at once the salient points to which the attention of local authorities and their officials should be directed. It deals with important questions of selection and lay-out of site, the accommodation and planning of the houses, construction of roads and services, and concludes with a description of the plans that are illustrated. The plans—which are reproduced herewith—include the lay-out plans of schemes at Glengarnock, Cambuslang, and Gourock. Five different types of cottages are illustrated, and four photographs of completed houses at Gourock are also included.

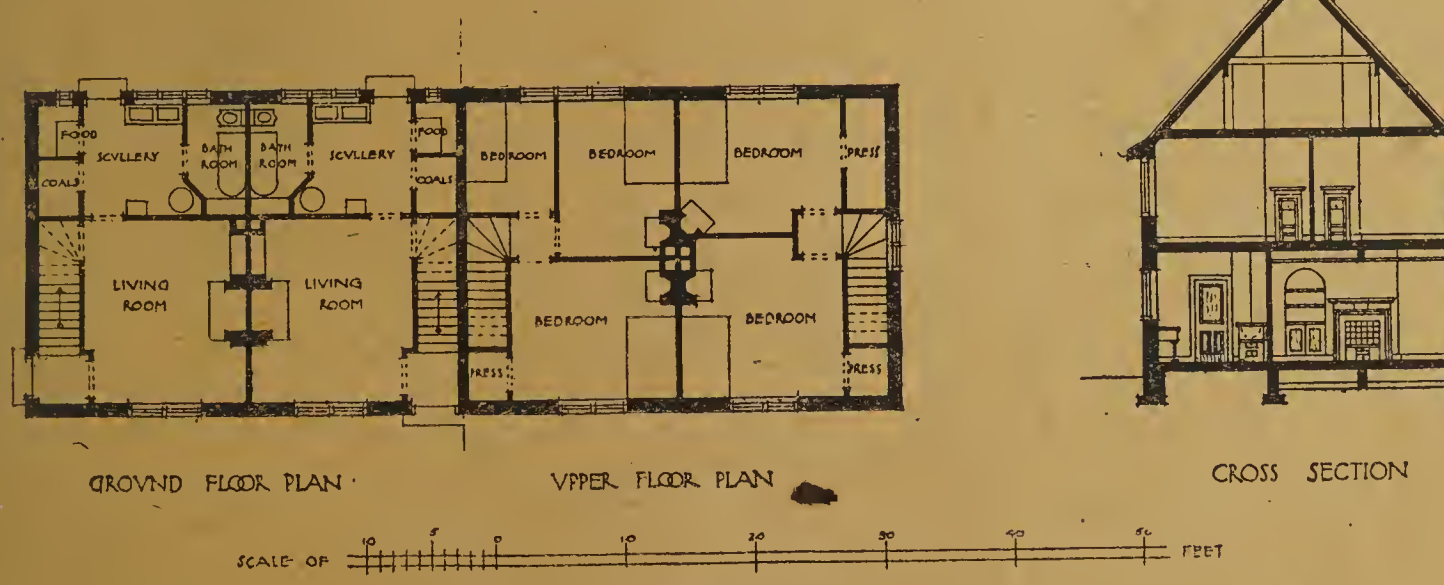
TYPE A.

This plan illustrates a group of four houses and shows probably the most economical arrangement of plan. Passages are reduced to a minimum, and there is an absence of waste space. The end houses have two bedrooms on the upper floor and the intermediate houses three bedrooms. The bathroom is a separate apartment entered from the scullery. This arrangement has the effect of reducing to a minimum the length of piping required for the hot-water supply from the range in the living room, but the arrangement otherwise is open to objection on the ground of convenience. No provision has been shown on the plan for direct access to the back gardens of the intermediate houses. This may be considered necessary, and may be provided by means of bends through houses or by access paths. This type of plan is not suitable for use on north frontages. The elevations are treated in a simple manner with brick base and rough-cast walls. The lowering of the wallhead level at the ends of the groups has a pleasing effect, and tends to reduce the otherwise monotonous effect of the wallhead carried throughout at the same level.

Houses of this type, with slight modifications in the details of the plans and elevations, have been erected at Glengarnock and Gourock, and at various sites in Lanarkshire.

TYPE B.

This plan shows a group of three houses designed with "through" living-room for use on north frontages. This plan involves a wide frontage, but is a type which will be found essential on most schemes. The entrance to the bathroom in the end house is from the entrance passage, and it will be noted that in this position the supply of hot water from the boiler of the living-room fireplace is economically obtained. This factor has determined the position of the living-room fireplace, which otherwise would have been better placed on the wall opposite the door. Its present position between the two doors does not conduce to comfort in the sitting space round the fire and tends to interfere with the traffic between the front door and the scullery. The size of the third bedroom on this plan is rather small. The wallhead at the back wall is kept up the full height, and thus enables square ceilings to be provided for most of the bedrooms. The plan of the intermediate houses illustrates a useful arrangement by which two of the apartments are provided on the ground floor; one of these can be conveniently used either as a parlour or bedroom. The provision of the bathroom on the upper floor is more expensive than if it had been provided on the ground floor, as additional length of piping is required.



Group of Four Houses: Type A.

Houses of this type have been erected at Gourock and at various sites in Lanarkshire.

TYPE C.

This plan shows a pair of houses with a parlour in addition to the living-room and three bedrooms. The bathroom is at the foot of the stairs, and is therefore convenient of access from the rooms on either floor. The open staircase in this type adds interest and appearance to the entrance passage, which is large enough to provide suitable hanging accommodation for coats and hats. The elevations are rather more ambitious than in the other types, and the upper portion of the front wall between the projecting gables is executed with slate hanging.

Houses of this type have been erected at Gourock.

TYPE D.

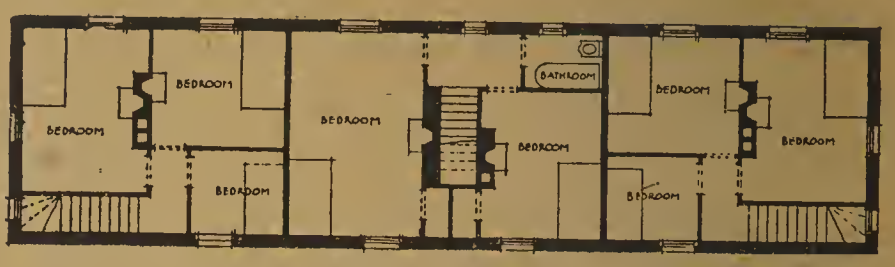
This plan shows a group of four houses of "flatted" type, each house having an independent entrance. This type, in addition to being most economical, has been found to be attractive to Scottish tenants, and is especially suitable for use in burghal or certain town areas, where it might form a suitable link between the existing tenement buildings and the cottage type of house. The entrance to the bathroom is from the passage, and each house has a good-sized living-room, scullery, &c., and two bedrooms. Good cupboard accommodation is provided. The ground-floor houses have direct access to the back gardens. The want of similar access in the case of the upper-floor houses is not greatly felt, as the main entrance is at the side, and therefore entrance to the garden can conveniently be obtained. Each house is provided with a separate back garden.

Houses of this type have been erected at Glengarnock, Gourock, and at various sites in Lanarkshire.

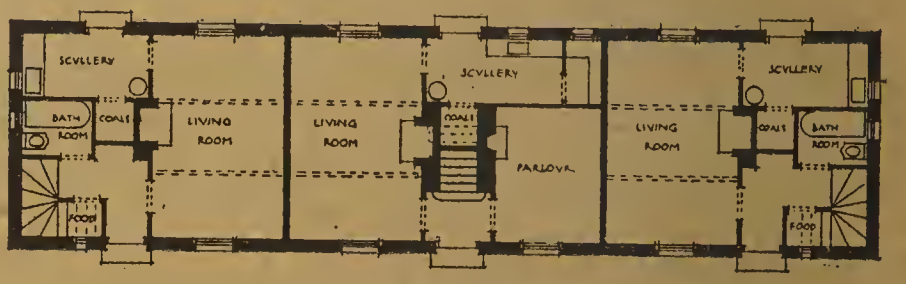
TYPES E AND F.

This plan shows two types of houses built one storey in height. Type E provides two bedrooms in addition to living-room, scullery, &c. It will be noted that one of the two apartments is entered from the entrance porch, and could therefore be suitably used as a parlour. The bathroom is entered off an independent lobby, to which, however, access is obtained through the living-room, an arrangement not altogether satisfactory. Type F has similar accommodation to type E, but has a small third bedroom in addition. The arrangement of the plan is on similar lines. The bathroom, however, is entered directly off the scullery, and this arrangement is open to considerable objection. The bathroom in both types of plans is in close proximity to the living-room fireplace, and the necessary hot-water supply piping is thus reduced to a minimum. The single-storey house, while it is

FRONT ELEVATION

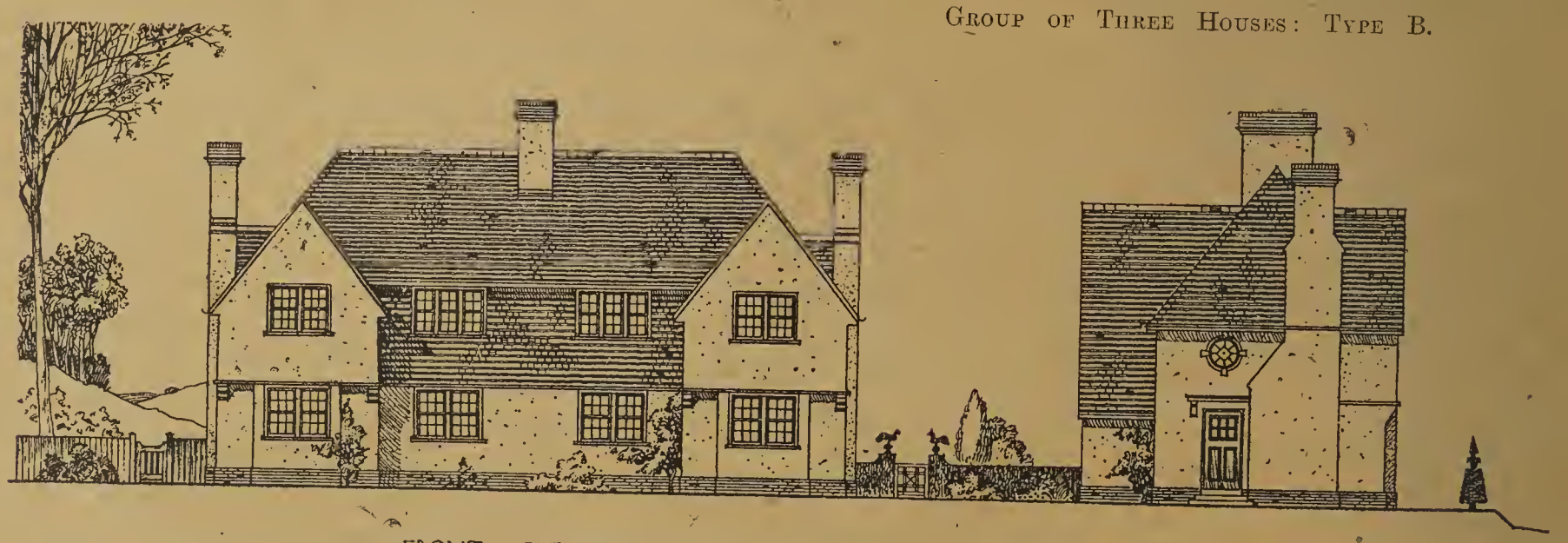


VPPER FLOOR PLAN

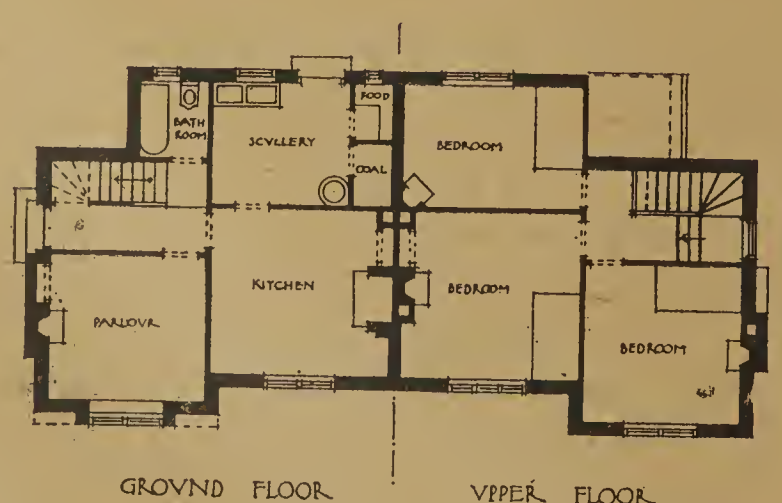


GROVND FLOOR PLAN

Group of Three Houses: Type B.

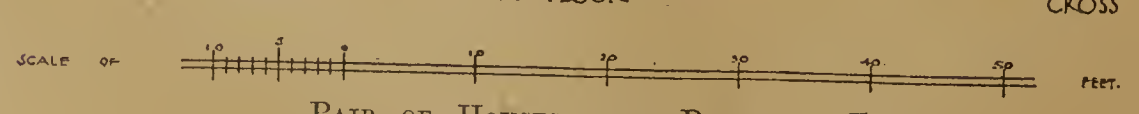


FRONT ELEVATION SIDE ELEVATION



GROVND FLOOR VPPER FLOOR

CROSS SECTION



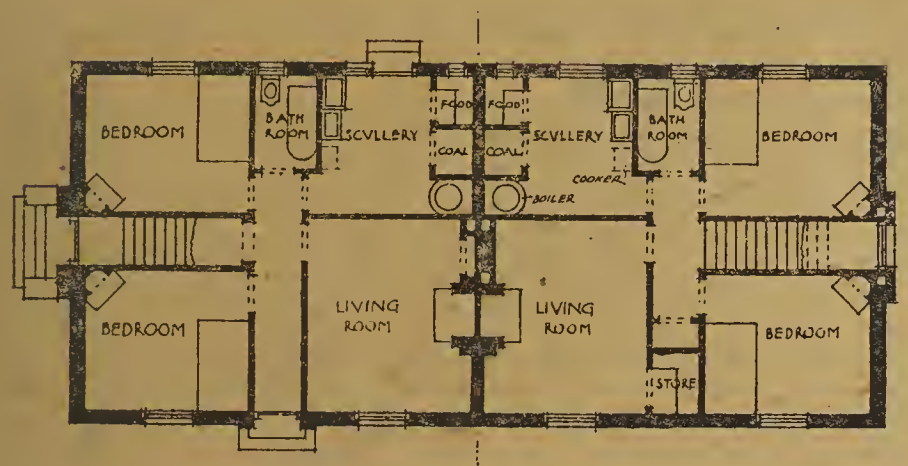
Pair of Houses with Parlour: Type C.

easily worked and therefore attractive to certain tenants, is not as a general rule an economical type to erect. In practice, however, it has been found that the examples illustrated compare favourably in cost with houses of similar accommodation built two storeys in height. This may be due to the ease and rapidity with which this type can be erected and to the small amount of scaffolding necessary. This type naturally involves wide frontages, and is therefore more particularly suitable for rural districts.

Houses of these types have been erected at Glengarnock, Invergordon, and at various sites in Lanarkshire.

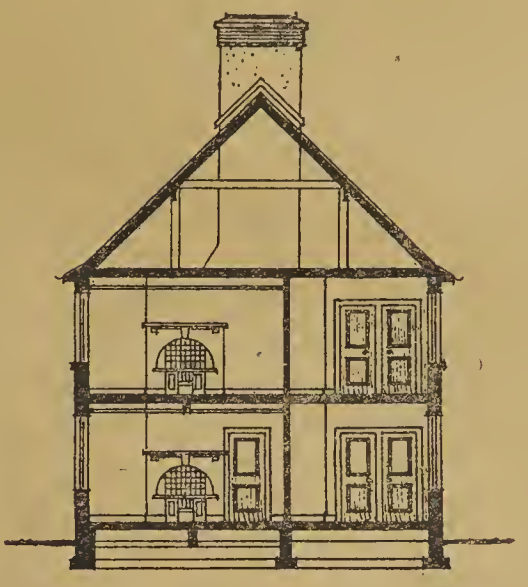
FRONT ELEVATION

END ELEVATION



GROVND-FLOOR

VPPER-FLOOF



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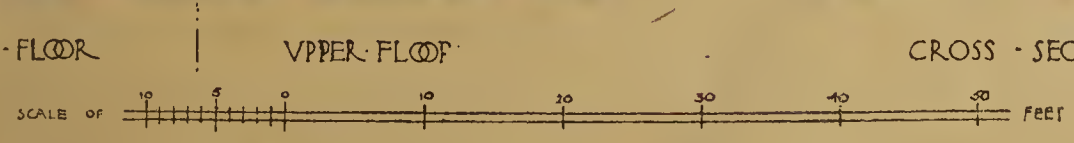


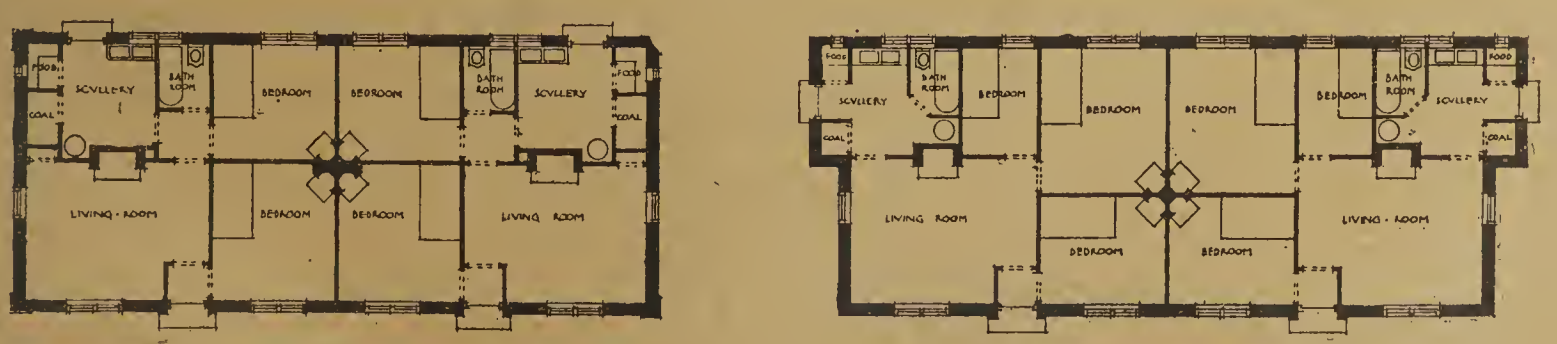
Group of Flatted Houses: Type D.

GENERAL.

In the carrying out of the various schemes undertaken by the board, every endeavour has been made, while providing houses with suitable accommodation and convenience, to reduce the cost to the lowest possible sum consistent with sound methods of construction. The cost of building under war conditions has naturally been high. Sufficient labour has not

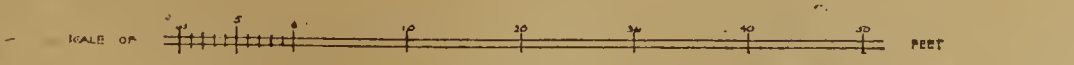
FRONT ELEVATION

FRONT ELEVATION



PLAN

PLAN.



Single-Storey Houses: Types E and F.

been available and materials have been difficult to obtain. It will be recognised therefore that the plans show what has been considered to be the most economical arrangement of plan and as indicating the minimum accommodation and sizes of apartments that should be provided. The storage and cupboard accommodation are, in the majority of the plans, hardly sufficient, and attention has been drawn to the lack of provision for storing such articles as perambulator, bicycle, mangle, &c. It will be noted that back additions are avoided in all plans, and that careful attention has been paid to the grouping of chimneys and of sanitary fittings.

ROAD BOARD WORK IN 1917-18.

TAR DISTRIBUTION UNDER PERMITS.

The eighth annual report of the Road Board was issued on Friday last.

During the twelve months under review the board distributed a limited sum out of the Road Improvement Fund, mainly in the form of assistance to expenditure on the tar treatment of roads. The total sum distributed by way of grants for road crust work was £153,109, and £76,182 by way of loans. The grants for other purposes amounted only to £6,182.

The board again call attention to the deterioration of the roads in Great Britain by reason of the shortage of labour and materials on the one hand, and the increase of heavy motor traffic, directly and indirectly connected with military movements, on the other. To deal with the situation the Road Stone Control Committee was appointed in August, 1917, and has done useful work in regulating the supply and transport of road materials. For the calendar year 1918 a bulk allocation of 47,000,000 gallons of tar was made to the board for road purposes. This has been distributed among highway authorities and others for use under permits on roads of national importance. The board has continued the special work of supervising the construction and maintenance of new roads and the improvement of existing roads for military purposes, and the making good of damage caused by heavy military traffic. The total estimated cost of these works up to March 31st last amounted to £4,424,717.

The report mentions that in connection with the special works undertaken for other Government departments mainly by direct labour, a temporary staff fluctuating in numbers between seven and eight thousand was employed throughout the year under the direction of Mr. J. S. Killick, the county surveyor of Hertfordshire, previously the board's assistant engineer, who is now acting manager and engineer in the absence in France of Brigadier-General H. P. Maybury, C.B. The thanks of the board are extended to the county councils of Durham and Essex for the continued loan of the services of Mr. A. E. Brookes, county surveyor of Durham, and Mr. A. J. Lyddon, assistant county surveyor of Essex, who have rendered valuable assistance as engineers-in-charge in connection with the special works.

Waterproofing of Cement.—Captain Scharroo, of the Military School of Engineers in Holland, has contributed to a Dutch magazine a very interesting article—the first of a series—relating to the waterproofing of Portland cement with "Pudlo." After giving a brief explanation of the various methods of waterproofing cement, he states that he found both liquids and powders generally affected the cement adversely. He was therefore very sceptical about the outcome of his experiments with the powder "Pudlo." The results, however, were so successful and surprising that in the interests of the Dutch building trade he decided to publish the results. Reference is made to some tensile and compression tests made with Pudloed concrete by Messrs. Koning and Bienfait, the Dutch cement experts, and from these Captain Scharroo's experiments are confirmed that "Pudlo" makes cement perfectly impervious without detrimentally affecting the cement. He urges the use of Pudloed cement in the construction of concrete ships. The Dutch agent for Messrs. Kerner-Greenwood & Co., Ltd., of King's Lynn, the makers of "Pudlo," states that Captain Scharroo is a well-known expert on cement, and that the publication of his experiments in the Dutch technical paper *Gewapend Beton* is causing many inquiries from other authorities.

1.—Flatted type of house somewhat similar in arrangement to design D, but with side porch additional.

2.—C type houses. The back elevation faces the street.

3.—The house in foreground is similar to end house in design B.

4.—House in foreground shows the front elevation of the design C.

Views of Houses Erected at Gourock by the Scottish Local Government Board for the Admiralty.

Municipal Salvage.

By J. C. DAWES, Technical Adviser to the National Salvage Council.

[Address delivered at the Annual Meeting of the Institute of Cleansing Superintendents.—*Conclusion.*]

No apology is necessary for once more introducing the question of salving old tin containers. The subject may have been discussed *ad nauseum* at previous conferences, but little progress has been made. I am of opinion that we have failed because we have had to depend upon others. In future we can treat the tins ourselves. Many have been the promises made to us by prospectors and others; but in pre-war days very few authorities found the treatment and disposal of old tins a really profitable investment.

In more recent years the old tin can came to be regarded as the sport of the crank, or the plaything of the adventurer, and, I am afraid, in some instances, it proved to be the despair of the financier; but the war has changed all this, or rather has brought about circumstances which have forced upon us the duty of utilising this material.

Old tins may now be adapted for re-use, and Mr. Currie has told us what can be done in this direction. I only wish to remind you that 90,000 tons of material are available for salvage every year.

My primary object in selecting these four materials—fuel, waste paper, textiles and tins—for reference is to indicate that the whole of these materials can be separated and salved mechanically by the introduction of a composite screening plant, and, what is more, the same machine affords facilities for the picking out of glass, rubber, string and other inorganic materials.

Before leaving the question of inorganic matter, I ought, perhaps, to mention that the question of extracting the dust from screening machines has not been lost sight of, and we hope it may prove quite practicable to remove all dust in such a way that no harm can come to the workers from this cause.

Turning now for a moment to the salvage of organic refuse, there is no doubt that there are great possibilities in this direction. The effective utilisation of garbage, condemned foodstuffs, slaughterhouse waste, vegetable and fish waste constitutes a most interesting study.

From this short list you will recognise that we have materials rich in protein, and others with large carbohydrate contents. After proper treatment these materials can be utilised in the proportion of concentrated feeding-stuffs, which is a point of very considerable importance.

I have already said there is great scope for capable chemists in salvage work generally, but this particular phase of the work is full of possibilities for them. To discuss the whole question of the utilisation of organic waste would require a special session of the conference. It has already been done at the more recent conferences of local authorities, and, if necessary, any particular point can be raised in the discussion. I only wish to mention that, for the most part, the results we desire to obtain from these materials can be secured by the use of one set of machines.

It is important to local authorities to know that machines have been designed which are capable of performing the whole of the drying or rendering work which might be required, whilst others will, more or less, effectively de-grease, de-oil and prepare dried feeding-meals.

Another point of interest to corporations is that the same plant will de-grease or de-oil certain inorganic materials, such as oily waste, &c., of which there are regular arisings in large gas, electricity, tramway or other municipal works.

MACHINERY.

The question of salvage machinery has not been dealt with at any length in the district conferences, and this constitutes my reason for dealing with the subject at this meeting. It must be understood that to carry out a complete salvage scheme certain machinery is essential, and local authorities will do well to begin to consider the installation of plant.

I do not say that plants can be obtained at the present time. As a matter of fact, it would be quite impossible to supply a sufficient number of machines, although it is hoped that a limited number will be made available. There will not, however, be enough to go round. This fact, however cannot be held to be a sufficient excuse for the abandonment or postponement of local salvage schemes. Large quantities of inorganic material are being and more can be salved without machinery, whilst certain kinds of organic material can be disposed of without treatment, and the remainder can be treated by private de-greasing firms, a number of whom are now prepared to give guarantees against the improper use of any material sent to them.

Whether local authorities undertake the preparation of concentrated feeding-stuffs themselves, or whether the same are prepared by private enterprise is not at the present moment the great point. The material is wanted. The need is a national one. Supplies must be forthcoming either from one source or the other, and where a local authority cannot undertake the treatment of its own arisings arrangements should at once be made for the material to be sent to reliable firms, always having regard to distances and transport.

The special collection of kitchen waste for use as pig food is another matter now receiving considerable attention, and in a number of towns special collections are now in operation. These collections are, more or less, successful; but experience goes to show that where the collection is part of a municipal pig-feeding scheme it is more successful economically than when it is a collection scheme only.

You have heard the wonderful figures sent to us from America. You have also heard the Director-General recite the surprising results achieved in twenty-nine cities in America where separate collections are in operation.

What can be done in America in the matter of collection should not prove impossible—though it might have to be carried out on a much smaller scale—in Britain. It is estimated that at the present time we are wasting material sufficient to feed 500,000 pigs, to say nothing of the glycerine content of this material, which, were we sufficiently well organised, we could extract before the swill was fed to the pigs. We have to admit that material which should be going into explosives is at the present time going into pigs, and with no advantage to the pigs.

Another interesting feature in the American utilisation scheme is that several cities are now erecting plant for the manufacture of alcohol from garbage on a large scale. This has also been done experimentally in England. It is claimed that the American product so produced is equal to a high-grade grain alcohol.

SEPARATE COLLECTIONS.

In discussing the question of separate collections it is necessary to add a proviso that special local conditions must always be taken into consideration. In many of our towns it might prove quite impracticable to introduce complete schemes for the separate storage and collection of organic material; but, at the same time, it might be found quite practicable to introduce partial schemes in towns where complete schemes are considered to be impossible.

You will remember that a questionaire was addressed to local authorities a short time ago, when the opinion of responsible officers was asked as to the possibility of introducing separate collection schemes. For some reason the majority of our members failed to express an opinion. I cannot understand why this should be, unless it be that so many forms are sent to trouble us from time to time; but you may be interested to know that of the 47 officers who did record an opinion 22 consider the proposal to be practical given collection and labour facilities, whilst the remaining 25 expressed the opinion that it would be impractical.

One thing is quite certain, and that is if it were found possible for local authorities to institute general schemes for the separate collection of organic materials suitable for pig food, the pig-feeding problem would be solved. Large quantities of textile fat could be first extracted from the swill, and the pig subsequently fed with a sterile food to the great advantage of all concerned.

The question as to the practicability of the special collection is subject suitable for our discussion.

Just one more point before closing. We are very anxious in the National Salvage Department to obtain reliable data as to what is happening throughout the country. To this end we propose to inflict upon you as responsible officers of local authorities still another quarterly return form.

When you see it you will probably consider it rather formidable. You will notice that we are asking to be informed of all salvage work that is being done. You will also observe that we desire to be in such a position that we shall know what is not being done. Few officers will be in a position to return answers to the whole of the questions on the form, but all will be interested in some of them, and we hope in an increasing number every quarter.

The information so collected will, when tabulated, be very valuable, and I think one might promise that, in the event of a responsible officer of a local authority desiring to have data on any particular point, we shall be prepared to supply the same from the tabulated results so obtained. Our interest in the form, therefore, is a mutual one, and I should like to ask that the forms be filled up with great care and promptness in order that our work at headquarters might be facilitated.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Was it not very fitting that at the recent annual conference of the Institute of Cleansing Superintendents the subject of Salvage and the Utilisation of Waste should have been the principal subject discussed? Is it not evident that this country in the past has been extremely negligent and careless with regard to its waste products, and that the war, having created a scarcity of so many essential commodities, has taught us a lesson in thrift which may be the means of showing us that the old adage of "Waste not, want not" is very true and should be scrupulously followed?

* * * *

Is not the surveyor of Ossett to be congratulated on his successful installation of a plant to deal with the clinker from the refuse destructor for the purpose of making tar-macadam? Is it not evident that the successful experiments made in this direction some years ago by Mr. Lovegrove at Hornsey have taken root, and that this description of road material has come to stay; also that sufficient time has now elapsed to prove that clinker tar-macadam, if the clinker has been thoroughly fused, has considerable wearing resistance?

* * * *

Was not Mr. Justice Bailhache's summing up in the recent Heysham case, with reference to the question as to what is a public highway, a most able and masterly exposition of what constitutes dedication of a road to the public? And unless, on appeal, there is a reversal of the verdict, is it not evident that a long user by the public of a road without interference by the owner of the land constitutes it a public highway without any personal dedication of it by the owner?

* * * *

Have not many attempts been made to construct cheap dwelling houses of concrete, and will the efforts of Mr. William Calway, of Swansea, in this direction be crowned with better success than those of previous inventors? But when we read in the papers that at a demonstration recently of his machine "a wall 26 ft. long by 12 in. deep and 9 in. in thickness was built by three men within the hour," does it not look as if Mr. Calway has hit upon a device that should go far to cheapen such a description of building construction?

* * * *

In view of the urgent necessity for the saving of coal, shall we not have to put up with very much more darkened streets this winter? Is it not therefore likely that there will be more loss of life from street accidents unless people are much more cautious than they have been? And is it not to be hoped that the activities of the Safety First Council will bear fruit in this direction and that instead of an increase in the number of street accidents there will be a diminution?

* * * *

Was it not rather a startling statement, made by a Mr. Cramp at the Trades Union Congress lately, that the milk which went to London was "of such a quality that an average spoonful of it contained more bacteria than an average spoonful of sewage"? If this is a fact is it not wonderful that the whole population of the Metropolis are not smitten with typhoid fever? What will the metropolitan medical officers of health and the sanitary inspectors of the various districts have to say to this terrifying accusation? By the way, what did Mr. Cramp mean by an "average" spoonful; and is he aware that certain bacteria are essential in our food in order to support life?

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

Contract with Officer of Local Authority.—"House" writes: A surveyor is appointed by a council and is subsequently asked to rent a house from the council. If he does so, would he be considered to have entered into a bargain or contract with his council for the purposes of the Public Health Act, 1875, such as is prohibited by sec. 193 of that Act?

This section was amended by sec. 2 of the Public Health (Members and Officers) Act, 1885, which provides that (notwithstanding anything in the former section, or any similar restrictions in any local Act to the contrary) it shall not be unlawful for an officer to be concerned or interested in any contract with the local authority for (*inter alia*) the leasing or hiring of "lands," made with the consent of two-thirds of the members of the local authority present at a meeting held after seven clear days' notice shall have been published in a local newspaper and sent to every member, stating the nature of the contract and the time and place of the meeting. By sec. 4 of the Act of 1875 the expression "lands" includes (*inter alia*) messuages and buildings. In my opinion, therefore, an agreement between the council and the surveyor for the letting of a house to the latter would be legal, provided it were made with such consent.

HOUSING NOW AND AFTER THE WAR.

A MID-LANARK GRIEVANCE.

At a recent meeting of the District Committee of the Middle Ward of the county of Lanark dissatisfaction was expressed with the delay which had taken place on the part of the Government in making arrangements for the erection of 250 houses which had been sanctioned by the Government in the Mid-Lanark area. It was stated that there was keen resentment in various districts that no progress had yet been made in the matter, although it had been officially stated in the House of Commons that Treasury consent to the scheme had been given. It was ultimately decided to send a protest to the Local Government Board against the delay.

PRIVATE ENTERPRISE.

A conference on housing, convened by the Surveyors' Institution, was held recently, and the report of the proceedings has now been forwarded to the President of the Local Government Board. The object of the conference, which was attended by representatives of important organisations, was to determine how the co-operation of private enterprise could be assured, in order to make good the shortage of working-class dwellings after the war. The conference unanimously agreed that, under existing conditions, no form of private enterprise could take its part in building working-class houses unless adequate financial assistance were made available. The opinion was expressed that the problem could best be dealt with by a grant from national funds, made to all agencies which erect houses according to approved schemes during the transition period, such grant to represent the extra war cost. The Government should, in the opinion of the conference, approach the problem mainly from the standpoint of national requirements.

Enniskillen Urban District Council have agreed to build fourteen additional workmen's houses.

Great Torrington Town Council have instructed their surveyor, Mr. H. Settle, to attend the Housing Conference which is to be held at Exeter on September 25th.

Sunderland Town Council have appointed a committee with power to purchase 25 acres of land for a housing scheme. The land is at the west end of the town, and the price asked is £12,000.

The Local Government Board have intimated to the Thetford Rural District Council that seventy-eight houses will be required in the rural area. It is notified that an inspector will visit the district shortly to confer with the council on the matter.

At a meeting of the Birkenhead Town Council, Alderman Mason, replying to a statement that all houses to be built under the Gilbrook scheme would have baths excepting flats, said the plans of the Health Committee had not been altered in that respect, and it was intended to supply flats with baths.

Ripon City Council have adopted a recommendation of the Highways Committee that Mr. A. Barlow, city surveyor, and Mr. Hill, assistant city surveyor, should submit a plan for the lay-out of the Aismunderby estate under the new housing scheme, against a suggestion that some firm of architects specially skilled in this kind of work should be engaged.

Newport (Mon.) Town Council on Tuesday agreed to prepare a scheme for the erection of 1,000 houses. It was stated that the houses would cost £500 each, and that the economic rent would run to 17s. 6d. per week. The town council also passed a proposition to charge an economic rent, whereupon the mayor said, "After that you may as well abandon the whole scheme. It is simply a resolution to dodge the whole proposal. I am chairman of the Housing Committee. You may as well have a new chairman."

Electricity for War Work.—Amendments to the Defence of the Realm Regulations, which are published in the *London Gazette*, confer on the Minister of Munitions power to prohibit or to restrict the supply of electricity to any premises where such a step is desirable to maintain or to increase the supply of light, heat, or power for war work No order is to be made for the closing of any power station belonging to any local authority or for the connection of any such power station with any other power station, except with the concurrence of the appropriate Government Department.

National Kitchens in Villages.—In view of the scarcity of fuel, it has been decided that the development of the National Kitchens movement cannot be confined to the towns, but must be extended to the rural districts. It is suggested that a central committee, on which organisations interested in village welfare would be represented, should be established in London to direct policy. Co-operation would be sought from county committees of a similar character, which would have the task of encouraging and promoting the formation of village committees. Villages could be grouped for distribution of supplies, and also, perhaps, for supervision.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Ashton-under-Lyme T.C.—The town council have completed the purchase of property and land for the extension of the tramways depot, Mossley-road.

REFUSE COLLECTION AND DISPOSAL.

Alcester R.D.C.—The sanitary surveyor, Mr. Cyril B. Machin, has been instructed to carry out proposals as to national salvage. The refuse collection men are to receive a bonus upon the paper and rags salved of about 1s. 9d. per cwt.

Hartlepool T.C.—Upon a report being submitted that the refuse destructor had been closed owing to the difficulty of obtaining labour, Dr. Gibb commented upon the seriousness of the step to the health of the town. The borough engineer, Mr. A. P. Horsley, stated that there was not a man on the staff who would tackle the work. Eventually the town council referred the matter to committee with a view to restarting the destructor as soon as possible.

West Hartlepool T.C.—The borough surveyor, Mr. N. F. Dennis, has been authorised to engage the services of an extra man for three months to endeavour if possible to increase the salvage from house refuse by greater care being devoted to the sorting.

ROADS AND MATERIALS.

Andover T.C.—A decision has been reached to purchase land across Goodman's Meadow for £375 for the construction of a new road.

Burgess Hill U.D.C.—The council are asking the county council to contribute the entire cost during the coming year of the maintenance of the highways other than main roads within the district to which the council had contributed in previous years.

Dawlish U.D.C.—Devon County Council, having renewed the contract for the maintenance and repair of main roads and bridges, it was decided, in view of the extra cost of labour and material, to ask the county council to contribute £600 a year towards the cost of the repair of the main roads, in addition to the sum allowed for tar-spraying, and also to refund the extra cost of the upkeep incurred during the past year.

Driffield R.D.C.—The council resolved to invest £3,000 in War Loan, making a total of £8,000 so invested, the chairman explaining that they were investing money because they could not spend it; but as soon as they got to normal times the whole of this money would be required. They had seriously "starved" the roads since the war.

Dumbartonshire C.C.—The Western District Committee have decided to confine road operations for 1918-19 to the upkeep of the main roads at most necessitous parts. Tar-macadam surfacing will be carried out on the Stirling road at Bonhill, the Balloch road, and the Garloch and Loch Long road, near Hellensburgh.

Hythe T.C.—The borough surveyor, Mr. J. S. Green, is in communication with the Road Board with respect to the repair of Scanlan Bridge-road, Rampart-road, and Portland-road, which have been damaged by military traffic.

Lanchester R.D.C.—A scheme has been approved for the improvement of the road between Stannifordham and Consett Junction.

Littlehampton U.D.C.—The *Sussex Daily News*, in a review of the condition of local roads, states that, although the amount of road material used has been very small, the road surfaces appear to be for the most part equal to pre-war days. "A great deal of credit for this," it states, "is due to the energetic surveyor (Mr. Reg. Booker), who carried out extensive tarring with great success. The use of tar has proved invaluable for preserving the road surfaces and providing clean and decent roads with a minimum of inconvenience from dust. The surveyor and his staff are also to be congratulated upon the manner in which the roads have been kept sweet and clean. Littlehampton's streets have never presented a more cleanly appearance than they have during the present summer. The great mileage of roads in the East Preston rural district is also in a satisfactory condition."

Luton T.C.—A scheme has been approved for making up Leagrove-road from the Midland Railway bridge to Cavendish-road, at an estimated cost of £500.

New Romney T.C.—The borough surveyor, Mr. F. Simmonds, has been authorised to purchase a tip-cart.

Scalby R.D.C.—The surveyor, Mr. J. A. Iveson, reported that tar-spraying was effecting a great saving in the upkeep of roads, and a much greater area should be treated.

Uckfield U.D.C.—The East Sussex County Council announce their intention to increase their contributions towards the cost of tarring main roads.

West Hartlepool T.C.—A letter was received from the Easington Rural District Council expressing regret that West Hartlepool did not now recommend taking any further steps at present with regard to the proposed new road from Easington to West Hartlepool, intimating that they could not support the alternative line of road proposed by the West Hartlepool borough engineer, and adding that if the West Hartlepool Council proposed to let the matter drop for the present the Easington Council would then abandon the question so far as the through route to West Hartlepool was concerned, and would take up the question of making the portion of the road in their own district. The town council now agreed, after a long discussion, that the matter be postponed *sine die*.

Wigton R.D.C.—With respect to the timber haulage over the Wilton to Sebergham road, a communication was read from the Road Board stating that a sum of £200 had been allotted for local stone required for repairing wheel tracks, and asking whether the council would accept £55 for the haulage and spreading of the stone. The surveyor, Mr. T. B. Simmons, stated that, as there were hundreds of tons of timber to be hauled over the road yet, he would not recommend the acceptance of the offer. The most part of £200 had already been spent upon this road. The clerk was directed to point out that the proposal was inadequate.

SEWERAGE AND SEWAGE DISPOSAL.

Braintree R.D.C.—A sewerage scheme for Bocking, which has been approved by the council, will be carried out after the war.

WATER, GAS, AND ELECTRICITY.

Aberdeen T.C.—The Electricity Committee propose to purchase new plant for the electricity works, at an estimated cost of £6,755.

Bishop's Castle R.D.C.—Upon the recommendation of a sub-committee the council have agreed to undertake the work of supplying water to Choulton, providing that Captain Plowden becomes responsible for half the cost and give the council the right to the supply of water and to lay pipes across the fields with free right of access.

Cork R.D.C.—The laying of a new water main from Monkstown to Glenbrook has been approved, at an estimated cost of £700.

Hollingbourne R.D.C.—It has been agreed to discuss with the ratepayers of Ulcombe a proposal to lay down a new system of pipes for a water supply, and obtain a supply from the Mid-Kent Water Company.

Newport (Mon.) T.C.—The town council on Tuesday last resolved, to apply to Parliament for power to proceed with the Talybont water supply scheme.

Poole T.C.—The town council are seeking for the consent of the Local Government Board to the purchase of a water-softening plant.

Stirlingshire C.C.—The Central District Committee have instructed Mr. Hogg, of Messrs. Crouch & Hogg, to inspect the works in connection with, and report on the whole system of, the Kippen water supply.

Swindon T.C.—The Waterworks Committee have received authority to lay an 8-in. water main in Wroughton-road, at an estimated cost of £2,300.

Wolverhampton T.C.—The Electricity Committee reported that there was a debit balance of £9,124 upon last year's working of the electricity undertaking. The loss was due to increased maintenance and other charges, including wages.

MISCELLANEOUS.

Chertsey R.D.C.—It was reported that the War Office had agreed to the request of the council in respect of the digging of gravel on Chobham Common. It was stated that this would mean a saving of £800 a year to the district.

Halifax T.C.—The town council have authorised the Food Control Committee to incur an expenditure of £3,500 for building and £1,000 for equipment in connection with the erection of a national restaurant in Bull Close-lane, on land belonging to the council, the rent of the site to be £30 per annum, with the option of purchase for £700. Application is to be made to the Director of National Kitchens for the maximum grant in respect of the buildings and equipment.

PERSONAL.

Mr. T. Kettle, borough surveyor of Lydd, has been granted a war bonus of £30 a year.

Mr F. Wilkinson, surveyor to the Prestatyn Urban District Council, has been appointed overseer under the Fuel and Lighting Order.

Mr. H. T. Wakelam, M.INST.C.E., county engineer of Middlesex, has, we notice, been elected by the Board of Trade to serve as a member of the Road Transport Board.

Mr. John Forrester, who recently resigned the position of surveyor to the Bradfield Rural District Council after twenty-four years' service, has been presented with a testimonial and a cheque by his numerous colleagues and friends.

Mr. A. E. Newey, engineer and surveyor to the Foleshill Rural District Council, has received an additional war bonus of £31 per annum, to date from July 1st. Mr. H. L. Thorpe, assistant surveyor, has been granted £10 per annum.

ROCHDALE BOROUGH SURVEYORSHIP.

Mr. Henry Yarwood, assistant borough surveyor, was last week recommended by the General Purposes Committee for appointment as borough surveyor *pro tem.* of Rochdale in succession to Mr. S. S. Platt, at a salary of £400 a year. With so many professional men on war service the committee did not deem it advisable to throw the position open to public competition at this stage. Mr. Yarwood, who is a native of the Rochdale district, was articled as a youth to Mr. J. B. Bamford, a former land and mining surveyor in the town. Afterwards, some thirty-six years ago, he joined Mr. Platt's staff as second assistant, becoming chief assistant and deputy surveyor on the death of Mr. Smithson twenty-five years ago. Under Mr. Platt he has for many years had charge of the office and has been responsible for several important branches of the work of the department. He has organised the corporation allotments' scheme. Mr. Yarwood is a member of the Institution of Municipal and County Engineers. The committee recommended that Mr. Platt's services be retained as consulting engineer at a salary of £200. The town council confirmed the recommendations of the committee with respect to the new appointments, and Alderman Cunliffe stated that during his thirty-seven years' service as borough surveyor Mr. Platt's initiative and engineering skill had been of great advantage and value to the town. In the carrying out of his manifold duties, he added, there had been no whisper or suspicion as to Mr. Platt's honesty, straightforwardness and integrity, though large sums of money passed through his hands and large contracts had to be negotiated.

PAPER SAVING.

LOCAL GOVERNMENT BOARD'S SUGGESTIONS TO LOCAL AUTHORITIES.

A circular has been issued by the Local Government Board to local authorities impressing on these bodies the importance of releasing for repulping all used papers and books which it is unnecessary to preserve. The shortage in the supply of paper, it is stated, is becoming more severe, and the country has to depend more and more on home supplies. Of these by far the most important source is paper which has been already used. One ton of such paper yields on the average on repulping 15 cwt. of new paper. While the quantity in the possession of any single authority may appear unimportant, the total that may be released by all local authorities should form a valuable addition to the supply in the present shortage.

It is at the same time urgently necessary (adds the circular) that any extravagance in printing and stationery should be avoided. Considerable economy may in some cases be effected by the use of smaller sheets and cheaper qualities of paper than are ordinarily supplied; this is especially so as regards records and communications which are not of permanent value; the blank backs of papers may be used for office notes. Notices of agenda, reports of meetings and proceedings, &c., other than minute books, should, unless they are of special importance, be dispensed with or condensed to the narrowest possible limits consistently with the obtaining of essential records. Binding of records should also be avoided, except in so far as necessary for their preservation, and the binding, where necessary, should be of the simplest kind that will serve the purpose.

Mytholmroyd Urban District Council, although it has but a few weeks been collecting waste paper, has proved that the work is not only wise, but profitable. Already over a ton of very valuable material has been dealt with. The surveyor, Mr. Sam Sutcliffe, has constructed a very simple and inexpensive contrivance for baling the material, which is of a very varied kind, making it much better to handle than when in bags.

LOCAL GOVERNMENT BOARD INQUIRIES.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the informaton given under this head as complete and accurate as possible.*

APPLICATION FOR LOAN.

St. Annes-on-Sea U.D.C.—£4,799 for electricity plant.

LOANS SANCTIONED.

Colchester T.C.—£5,188 for electricity plant.

Hythe T.C.—£4,300 for new water mains.

Luton T.C.—£77,686 for electricity extensions.

Nelson T.C.—£3,300 for a new ammonia recovery plant.

Walsall T.C.—£6,304 for the extension of the electricity works.

County Councils and Small Holdings.—The Westmorland County Council on Saturday passed resolutions urging the Government to provide all possible facilities for the acquisition of land for small holdings by county councils through their Small Holdings Committees, and recommending that county councils should be authorised to borrow for this purpose from other than Government sources, and, if necessary, to make advances from the county fund balances. It was urged that these facilities should be provided to meet any demands by discharged soldiers.

FOR OTHER ADVERTISEMENTS
See End of Paper.

BOROUGH OF HEMEL HEMPSTED.
HOUSING ASSISTANT.

As we go to press instructions reach us from Mr. Walter R. Locke, the Borough Surveyor and Waterworks Engineer of Hemel Hempsted, to notify applicants for the above vacancy—advertised on p. xii. of the present issue—that the salary for the post has now been fixed at £4 4s. per week.

CITY OF WESTMINSTER.

Wanted (probably for the duration of the war), in the offices of the City Engineer and Surveyor, Temporary (war substitute) Civil Engineering Assistants and Draughtsmen, with municipal experience, at a salary of £5 5s per week. Temporary (war substitute) General Assistants (civil engineering or municipal surveying qualifications), £4 9s. per week

Applicants, who must be ineligible for Military Service, should send particulars of their experience to the undersigned.

J. W. DUGDALE-BRADLEY, M.INST.C.E.
City Hall, Westminster, W.C. 2. (3,871)

AXBRIDGE RURAL DISTRICT COUNCIL.

Wanted, temporary Assistant in Highway Surveyor's Office (ineligible for Military Service). Salary, £2 10s. per week, to include the provision of a bicycle.

Applications, stating age, experience, present occupation, and accompanied by copies of three recent testimonials, must reach the undersigned not later than September 25th, 1918.

JNO. LOVELL,
District Surveyor.

Surveyor's Office,
Cheddar, Somerset.
September 11, 1918. (3,870)

URBAN DISTRICT OF FINCHLEY.

ENGINEER AND SURVEYOR'S DEPARTMENT.

TEMPORARY ASSISTANT.

The Council of the above-named District invites applications for the position of a Temporary Assistant in the Engineer and Surveyor's Department.

Candidates must be thoroughly competent to take levels, make surveys, prepare drawings, and to assist generally in the routine work of a drawing office.

Preference will be given to candidates who are holders of the Certificate of the Institution of Municipal and County Engineers. The period of appointment will be for the duration of the War, and applicants must not be eligible for military service.

Applications, stating age, experience, and salary required, and accompanied by copies of three recent testimonials, to reach me not later than the 28th day of September, 1918.

E. H. LISTER,
Clerk of the Council.

Council Offices,
Church End, Finchley, N. 3.
September 13, 1918. (3,872)

THE ACTIVATED SLUDGE PROCESS.

EXPERIMENTAL PLANT AT ST. ALBANS.

By J. Eade,
Works Manager.*

After careful consideration and a visit to the Worcester sewage works, the St. Albans Corporation decided, on the advice of Mr. Howard Humphreys, to allocate a sum of £300 for the purpose of carrying out experiments in connection with the activated sludge process, and the firm of Messrs. Jones & Attwood, of Stourbridge, agreed to render what assistance they could, and offered to the corporation the option of either paying for the equipment outright or hiring it for a period of twelve months.

For the purpose of experimenting, part of one of the existing tanks was divided off, and this was altered and sub-divided to the designs of the engineers. The mixing tank is 5 ft. 9 in. by 2 ft. by 5 ft. deep, with a capacity of 340 gallons approx. The aëration tank is divided by baffle walls, having small orifices to prevent short circuit of the sewage. The total length of the tanks is 57 ft. 3 in., with a width varying from 5 ft. to 7 ft. 2 in., and a depth of 5 ft. The capacity is 7,375 gallons. In a channel running the full length of the tank are fixed 46 diffusers, having an effective area of 32 sq. ft. and a ratio to the tank surface of 1·10. The diffusers are set in the lowest part of the floor, and have a direct head of 5 ft. over their surface.

The settlement tanks are of the inverted pyramid type, and are of three sizes, the first being 5 ft. 10 in. by 4 ft. 10 in. by 6 ft. deep, with a capacity of 612 gallons; the second is 5 ft. 10 in. by 7 ft. 10 in. by 7 ft. deep, with a capacity of 344 gallons; and the third is 5 ft. 10 in. by 10 ft. by 11 ft. 6 in. deep, with a capacity of 2,125 gallons. Baffle boards are fitted to these tanks, and the inflow is carried down two-thirds of the depths of the tanks before it is able to rise. The outflow is taken over cast-iron troughs, but in order to reduce the velocity and dissipate the flow both edges are used.

The floors of the settlement tanks slope not less than 60 deg from the horizontal. Each tank is connected to an air-lift well. From this well, which is fitted with a 3-in. diameter air-lift, sludge can be lifted at will from either of the tanks. The sludge chambers are also fitted with 2-in. diameter pipes and valves below the water-level for the purpose of delivering surplus sludge by gravitation to the sludge beds.

The re-aëration tank is 18 ft. 6 in. by 6 ft. 8 in. by 5 ft. deep having a similar section to the aëration tank, with diffusers set parallel to the flow of the sewage. The capacity is 2,194 gallons, and it is fitted with 17 diffusers in the lowest part of the floor, with a ratio to the surface of 1·10 approx.

EQUIPMENT.

The compressed air for supplying the plant is delivered from a No. 2 Alley & Maclellan vertical compressor, capable of delivering 50 cub. ft. of free air per minute at a speed of 450 r.p.m. This was part of the existing plant, and the power to drive it is taken from a 12-h.p. Teasdale (suction) gas engine, which also drives a 6-in. centrifugal pump.

From the compressor the air passes through a 6-ft. length of 12-in. cast-iron pipe set vertical, with inlet and outlet at the top for the purpose of intercepting any oil which may be carried from the compressor; 2-in. diameter cast-iron pipes are then used to carry the air to the tanks, which are divided into four sections, and each section is connected to a number of diffusers in the tanks by ¾-in. down pipes and fittings. Each down pipe is controlled by a valve for the purpose of regulating the supply of air to any particular set of diffusers, and for shutting it off when the necessity arises.

In order to economise the air consumption, each of the four sections of the air pipes is fitted with a pulsating valve, operated by an air supply taken from the general supply. The motive power is taken through an air wheel running partly submerged in oil, in a manner the exact reverse of a waterwheel, and this in turn operates a set of pilot valves which give a succession of puffs, or pulsations, to the air delivered to the diffusers. The operation gives a continuous cycle through four sections, and the time of blowing can be varied from 15 sec. to 6 min.

PLANT IN OPERATION.

The necessary structural work and alterations were carried out by direct labour under the superintendence of the manager, but, owing to war-time difficulties, the plant was not put into operation until February 25th of this year.

At the outset it was decided to experiment with settling tank effluent, and on March 25th a snap sample was taken, when there was 14 per cent of sludge in the tanks (as measured by settlement of a sample for one hour), and the following results of analysis were obtained:—

Description of sample: Bright clear liquid, few light solids, very slight smell. Nitrogen as parts per 100,000; free and saline ammonia, 3·55; albuminoid ammonia, ·29; nitrous, nil; nitrate, nil; oxygen absorbed in four hours, 1·36.

Previous samples taken of crude sewage show an oxygen absorption figure of 16·2 parts per 100,000, and it may be fairly assumed that the oxygen figures are comparable.

The settled sewage experiments were continued with encouraging results until June, when it was decided to test the plant with crude sewage taken direct from the coarse screening chamber, but before doing this a slight modification was made to the aëration and re-aëration tanks, and curved directors were built near the water level in such a way as to give more direct motion to the liquid.

On June 8th a trial was made with crude sewage, the sludge was built up more rapidly than with the settled effluent, and at the end of the week the effluent was bright and clear and free from smell. Then it gradually began to get cloudy, and the diffusers did not blow freely. The tanks were emptied on July 2nd, and the trouble was found to be owing to some detritus having got into the tanks. A connection was then made from the channel to the sedimentation tank, and precautions were taken to prevent further detritus from getting into the tanks. The sludge was soon built up again and the effluent has been good in appearance continuously, and over 30,000 gallons of crude sewage have been treated daily in the tanks.

The volume of air used has never exceeded 50 cub. ft. per minute, and it would be safe to give an average of 42 cub. ft. per minute. This is equal to 12½ cub. ft. of air per cub. ft. of sewage treated, and this economy is largely due to the constant use of the pulsating gear.

TRADE WASTES.

There are within the city boundary breweries, bleaching works, gasworks, straw hat works and a tallow factory. The waste liquor from these have not as yet caused serious trouble with the experimental plant.

I am of opinion that for the activated sludge process to be a success great care will have to be taken in the removal of detritus and fat. Finer screens than those generally in use will be necessary. The points in favour of the process are: (1) Large volumes of sewage can be treated on small areas, (2) the effluent is practically uniform concerning suspended matter, (3) the absence of smell during the treatment of sewage or from the sludge after treatment.

As far as St. Albans is concerned, the sludge would be less costly to deal with than the present sludge, which costs nearly £500 per annum for disposal in trenches. The sludge from this process could be dealt with in open lagoons without fear of nuisance, and even if given away there would be a considerable saving of the rates.

I should like it to be clearly understood that Mr. Howard Humphreys has never contemplated satisfying the Thames Conservancy by this process alone. His aim is to use it as a primary treatment, and then finish off the effluent on circular percolating filters at the lower end of the works. This would do away with pumping, and the present power could be used for the production of compressed air.

In conclusion, I am of opinion that the activated sludge process will play a great part in the treatment of sewage in the future, especially if the sludge can be dried and sold as a fertiliser now that there is a great shortage of other manures

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Rhyl's Derelict Pier.—At a meeting of the Rhyl Urban District Council it was reported that, following the request of the Ministry of Munitions that the pier should be sold for scrap, the town clerk had received a number of offers. In order to be able to deal with the same, the council decided to pay down the price asked by the Office of Woods and Forests for the freehold of the site.

Municipal Engineers at Wolverton.—In our report of July 19th last of a meeting of the Institution of Municipal Engineers held at Wolverton, the name of Mr. O. L. Browne (Bedford Borough) was included in the list of those present. Mr. Browne was present as stated, but did not, we are given to understand, represent Bedford in a municipal capacity on the occasion in question.

Municipal Employees' Strike at Teignmouth.—Workmen in the Teignmouth surveyor's and water engineer's department have "struck." The sum in dispute is about 1s. 6d. a week. First, a weekly wage of £2 was asked for. Then 6s. a week all round and all the year round was demanded, as well as the abolition of hour work. The council offered to increase wages by 1d. an hour, equivalent to about 4s. 6d. a week, but refused to do away with hour work. On this offer being declined, the council repeated its willingness to submit the question to arbitration. When the men concerned—about twenty or so—last Friday decided to "come out," notices were exhibited by the council offering jobs to horsemen at 37s. 6d. a week, and labourers and scavengers 8d. an hour.

* From a paper read at a meeting of the Association of Managers of Sewage Disposal Works, held at St. Albans.

AIR RAID DAMAGE TO PUBLIC WORKS.

LOCAL GOVERNMENT BOARD ANNOUNCEMENT.

The Local Government Board have notified a metropolitan borough council that the Treasury cannot sanction a charge against public funds for the reimbursement by the Government of the whole or part of the cost of making good damage done to public works, sewers, and other underground works through enemy air raids.

German Municipal Activities.—Fräulein Gertrud Bäumer, in the diary which she contributes to *Die Hilfe*, quotes (says the *Times*) the following account of the activities of a German municipality from an official memorandum issued at Danzig: "The town deals in coal, babies' soothers, methylated spirits and petroleum, old clothes, and wooden soles; it fattens pigs and geese, and breeds fowls and rabbits; it cooks dinner and supper every day for many thousands of people; it provides labour and horses, distributes prizes for horse breeding, and places orders for Army supplies; it estimates the harvest and counts the cattle, extracts fat from bones, and sells vegetables and fruit in certain shops; it dries vegetables and makes sausages; it allots land for potato and vegetable growing, and itself cultivates land; it collects or organises the collection of nettles and fruit stones; it buys wood in Germany and in the occupied territory; it kills beasts and makes jam, examines applications for leave from the front, and provides the farmers with manure; it revises the prices of bread, matches, meat, boots, and various foods, catches fish, and supplies machinery; it collects copper, aluminium, and brass; and it distributes sugar for jam-making, and regulates the feeding of sick persons and babies."

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

TEMPORARY ENGINEERING ASSISTANT.—September 16th.—Barrow Town Council.—Mr. W. C. Persey, borough engineer and surveyor, Town Hall, Barrow-in-Furness.

HOUSING ASSISTANT.—September 16th.—Hemel Hempsted Town Council.—Mr. Walter R. Locke, Town Hall, Hemel Hempsted.

ENGINEERING AND SURVEYING ASSISTANT.—September 21st.—Swansea Town Council. £250 a year.—Mr. J. Richard Heath, borough engineer and surveyor, Swansea.

FIRE BRIGADE SUPERINTENDENT.—September 23rd.—Long Eaton Urban District Council.—Mr. F. Worrall, engineer and surveyor, Electricity Works, Long Eaton, Derbyshire.

BOROUGH SURVEYOR AND SANITARY INSPECTOR.—September 27th.—Totnes Town Council. £160-£200.—Mr. Edward Windeatt, deputy town clerk, Town Clerk's Office, Totnes.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

CORNWALL.—September 16th.—Erection of a new pavilion at Tehidy Sanatorium.—Mr. E. H. Crispin, architect, County Hall, Truro.

REDDITCH.—For extensions to the electricity works.—Mr. F. F. Bayliss, architect to the urban district council, 18 Unicorn Hill, Redditch, Worcestershire.

Engineering: Iron and Steel.

ATHERTON.—September 16th.—Supply of two 110-kw. single-phase transformers.—Mr. B. Darby, resident electrical engineer, Atherton, Lancs.

Roads.

EDMONTON.—September 16th.—Supply of broken granite and Portland cement.—The Engineer, Urban Council Offices, Edmonton.

FYLDE.—September 21st.—The rural council have for sale a Whalley's 4-ft. tar-macadam or concrete mixer, vertical boiler 6 ft. 6 in. by 2 ft. 9 in. diameter; also one detached road scarifier and tines.—The Surveyor, Union Offices, Wesham, nr. Preston.

ROMFORD.—September 23rd.—For the supply of 650 tons of blue Guernsey granite.—The Acting Surveyor, Urban Council Offices, Market-place, Romford.

Sanitary.

WALSINGHAM.—For the supply of disinfectants.—W. O. Humphrey, Norwich-street, Fakenham, Norfolk.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

SEPTEMBER.

14.—Institution of Municipal and County Engineers: Meeting at Bridgwater.
14.—Association of Managers of Sewage Disposal Works: Meeting at Romford. 2 p.m.
20-21.—Institution of Municipal and County Engineers: Meeting at Middlesbrough.
27-28.—Institution of Municipal and County Engineers: Meeting at Penarth and Barry.

EXAMINATIONS.

THE SURVEYORS' INSTITUTION.

(Incorporated by Royal Charter),
12 GREAT GEORGE STREET, WESTMINSTER, S.W. 1.

EXAMINATIONS, 1919.

PRELIMINARY EXAMINATION.

Notice is given that the Preliminary Examination for the admission of Students will be held on the 15th and 16th of January next.

Candidates from the counties of Lancashire, Cheshire, Yorkshire, Durham, Cumberland, Westmorland, Northumberland, Staffordshire, and North Wales will be examined at Manchester. Candidates from other counties in England and Wales will be examined in London.

Irish Candidates will be examined in Dublin.

Scottish Candidates in Glasgow.

PROFESSIONAL EXAMINATIONS.

Notice is also given that the Annual Professional Examinations for Land Agents, Valuers, Building, Quantity and Mining Surveyors (held under the provisions of the Charter), will be held on the 24th to 28th of March next inclusive.

All English Candidates for the Professional Examinations are examined in London.

Irish Candidates in Dublin.

Scottish Candidates in Glasgow.

All applications for both the Preliminary and the Professional Examinations must be sent in before the end of September. The necessary Entry Forms for the various Examinations, and particulars as to subjects, course of examination, and prizes can be obtained of the Secretary.

(3.869)

APPOINTMENTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

BOROUGH OF TOTNES.

APPOINTMENT OF BOROUGH SURVEYOR AND SANITARY INSPECTOR.

The Town Council of the Borough of Totnes invite applications for the above position at a commencing salary of £160 (£170 if person appointed holds the Sanitary Institute Certificate for inspection of meat and food), rising by annual increments of £10 to £200.

Applicants must be qualified persons having previous experience and training in the Office of a Borough or Urban District Surveyor.

The person appointed will be required to devote the whole of his time to the duties of the office and will not be allowed to undertake any private practice.

Applications, stating age, occupation, and previous experience, accompanied by copies of not more than three recent testimonials, to be sent to the undersigned not later than 27th September next.

Canvassing, either directly or indirectly, is strictly prohibited, and will be a disqualification.

EDWARD WINDEATT,
Deputy Town Clerk.

Town Clerk's Office,
Totnes.
September 6, 1918.

(3,866)

The Surveyor

And Municipal and County Engineer.

Vol. LIV. SEPTEMBER 20, 1918. No. 1,392.

Minutes of Proceedings.

Dangerous Places near Highways (I). Questions frequently arise as to the duties and liabilities of highway authorities with respect to dangerous places near highways. As a general rule there is no obligation on the part of the authority to erect or repair fences between a highway and the adjoining land or premises, either in proximity to a dangerous place or elsewhere. But there are some far-reaching exceptions to this rule. In the first place, where there is a fence or wall which either supports a highway or protects it against a precipice, the authority are bound to keep it in repair *provided* it forms part of the highway. It will be seen that there is an element of uncertainty about this exception, because no general rule has been laid down as to when such a fence or wall does form part of the highway. It is a "question of fact" in each individual case. Secondly, in urban districts it is the duty of the district council, under Sec. 75 of the Towns Improvement Clauses Act, 1847, to put up a board or fence for the protection of passengers against any building or wall or anything affixed thereon which is in a ruinous state and dangerous to passengers; and under Sec. 83 of the same Act it is their duty to repair, protect or enclose any building or other place near a street which is dangerous to passengers—the expense of the necessary work being in each case recoverable from the owner of the property. These sections may be applied in a rural district by order of the Local Government Board. Thirdly, an unfenced quarry which is dangerous to the public, on unenclosed land within 50 yds. of a highway, can, by virtue of Sec. 3 of the Quarry Fencing Act, 1887, be dealt with as a nuisance under Secs. 91 to 111 of the Public Health Act, 1875; and it has been held that, where there is no owner or occupier of such a quarry against whom proceedings can be taken, the highway authority ought to fence it themselves. (*Foster* v. *Newhaven Harbour Trustees* [61 J.P., 629]). Fourthly, in some circumstances the omission to fence a dangerous place may amount to misfeasance, so as to render the highway authority liable in the event of an accident. Thus in *McClelland* v. *Manchester Corporation* (76 J.P., 21), an old road with an unfenced ravine at one end of it was dedicated to the public many years ago, and in 1903 the corporation made it up as a street, leaving the ravine unfenced. The plaintiff, driving at night along the street, drove over the edge of the ravine, and it was held that the corporation were liable because, having made up the road and opened it to the public as a street with this "hidden trap" at the end of it, the omission to fence was, in the circumstances, misfeasance. And again in *Whyler* v. *Bingham Rural District Council* ([1901] 1 Q.B., 45) there was a road with a deep ditch at one side. Both the ditch and the road were occasionally flooded, and in 1877 the council fenced off the ditch in order to protect passengers. In 1900, the fence being out of repair, the council caused it to be removed, with the intention of replacing it by posts. Three weeks after its removal, however, and before any posts had been erected, the road was flooded, and the plaintiff's husband drove into the ditch, and was drowned, and it was held that the council were liable.

* * * *

Reigate's Timber-Built Houses. It is a promising sign, when labour and materials for more substantial structures are so scarce, to find that there is a disposition in many localities to erect wooden houses; but all the same sympathy will be extended to the Reigate Rural District Council in their claim for the due recognition of the building by-laws by the builders of these houses. The chairman of the Plans Committee of this authority told the council recently that they had had a good deal of trouble in regard to the erection of wooden houses in contravention of the by-laws. One of the builders had already been fined, and in another case the owner had suspended work after receiving warning. The committee asked the council to declare that the man against whom proceedings had been taken had not shown sufficient cause why the building should not be pulled down, removed, or altered, and that the by-law should be enforced after the expiration of one month. The council promptly confirmed this recommendation, and also resolved to prosecute in another case. In this they displayed practical wisdom, for it would be manifestly absurd to consent to an abrogation of their legal authority and allow buildings to be put up in defiance of all rules and regulations. The chairman of the committee asserted that "there was really an epidemic of timber-built houses" in the district. The term need not be taken offensively or too critically in the circumstances, for after all the movement can only have the beneficial effect of making up in some degree for the shortage of housing accommodation of which we have heard so much. The main point to bear in view, so far as the council is concerned, is that timber-built houses, like other structures, must conform to the by-laws and come under the supervision of the local authority and its surveyor. In this regard the decision taken by the rural council will doubtless have the desired salutary effect upon those who are predisposed to take the law into their own hands.

* * * *

Housing and Private Enterprise. In view of the overwhelming part that was played by private enterprise in the provision of working-class dwellings before the war great interest attaches to the report of the conference of societies and institutions interested in this aspect of the housing question which was convened by the Surveyors' Institution in July last. The object of the conference was to determine how the co-operation of private enterprise can be secured in the solution of the after-war problem, which will without doubt tax to the full the energies of every form of housing effort. The conference unanimously agreed that under existing conditions no form of private enterprise can take its part in building working-class houses, unless adequate financial assistance is made available; and they proceeded to consider the most appropriate form in which such assistance could be given. In this connection two alternatives are possible—namely, an immediate grant towards the capital cost of approved schemes or a guaranteed income from such schemes during the period of transition to normal conditions. It is obvious that the application of public funds to the assistance of private enterprise raises a large and novel question of policy; but, assuming that the Government can be convinced of its desirability, we are inclined to agree with the conclusion arrived at by the conference that the former of the two alternatives named would be preferable. The report also deals with such matters as by-law reform, the effects of Part I. of the Finance (1909-10) Act, 1910, and the Increase of Rent and Mortgage Interest (War Restrictions) Act, 1915, and the questions of priority and standardisation as regards building materials. The report has been forwarded to the President of the Local Government Board, by whom, in view of his known attitude towards private enterprise in housing, it will no doubt receive sympathetic consideration.

* * * *

Air Raid Damage. In view of the decision of the Treasury to pay compensation up to £500 to owners of private property which suffers damage through enemy air raids, it is a little difficult to understand why they refused their sanction to the payment of compensation in similar circumstances in respect of injury to public works, sewers and other underground works. It would appear that, when once the principle had been admitted that the cost of making good damage caused by hostile acts of the enemy could properly be made a charge on the national

exchequer, both reason and fairness would have demanded its application alike to the property of individuals and corporate bodies, including local authorities. Moreover, the latest ruling of the Treasury hardly seems to be equitable even between the various local authorities themselves; for financial assistance has either been promised or given to certain coast towns which have suffered in other ways as a result of the war, and it would be only consistent if similar grants were made in respect of air raid damage, not only in special areas, but throughout the country. In all the circumstances we hope that it may not yet be too late to secure a reconsideration of the matter. The decision has been notified to a Metropolitan borough council through the medium of the Local Government Board; but it is at least possible that if a joint representation were made by the organisations comprising the several classes of local authorities, some more satisfactory result might be achieved.

* * * *

Salaries.

There has probably never been a time when the normal work of municipal engineers has been of greater importance from the public point of view than it is at present. For instance, the roads of the country have been necessarily allowed to get into a state of neglect during the war, and their adaptation to new traffic requirements is a problem requiring a high degree of technical skill. Similarly, with regard to all works affecting the preservation of the health of the community, such as water supply, sewerage and refuse disposal, the watchword during the period of reconstruction must be "efficiency." This means that the standard of professional attainment of municipal engineers must be raised or, at least, maintained at the old level—an end which can only be secured by the payment of salaries which will attract suitable men. It is decidedly disappointing to find, therefore, that in spite of representations which have been made to successive Presidents of the Local Government Board, appointments continue to be advertised from time to time at scandalously low remuneration. A recent example is afforded by the Long Sutton Urban District Council, which is seeking a "surveyor, rate collector, inspector of nuisances and inspector of allotments at a combined salary of £121 10s. per annum." The offer of such a "salary" at the present time is at once a disgrace to the council and an insult to the profession. The only hope is that the sum named may prove too small to attract even the incompetent.

* * * *

Forthcoming Meetings.

It will be remembered that on the occasion of his inauguration as president of the Institution of Municipal and County Engineers Mr. Hayward expressed the hope that his year of office would witness a considerable revival of the holding of meetings. That hope is being abundantly realised, and this week we have to call attention to two further gatherings that have been arranged. The first, which takes place to-day and to-morrow, will be held at Middlesbrough, when in addition to a paper descriptive of the public works of the town by Mr. S. E. Burgess, the borough engineer and surveyor, an attractive round of visits has been arranged. On Friday and Saturday of next week the members of the institution will assemble at Barry and Penarth, when Mr. J. C. Pardoe, the engineer and surveyor of Barry, will read a paper on "Municipal Works in Barry During the Past Thirty Years." Members will be provided with an opportunity of inspecting the works mentioned in the paper, including the Barry Garden Suburb, while a special feature of the meeting will be visits to the famous Barry Docks and the Penarth Cement Works. The proceedings at each meeting will open with an official civic welcome.

POST-WAR SANITATION.

SIR JAMES CRICHTON BROWNE AND THE LESSONS OF THE WAR.

In his presidential address on Friday last at the annual conference of the Sanitary Inspectors' Association, held in London, Sir James Crichton Browne spoke on the subject of post-war sanitation.

By the establishment of a Ministry of Health, to which the Government was pledged, sanitary inspectors would (said Sir James) become sanitary officers of health. Security of tenure would be conferred, and removal from office made subject to sanction of the Ministry. The inspectors would no longer have hanging over them the Damocles sword of the spite of some paltry member of the local authority, the dangerous sanitary defects of whose property they had felt bound to denounce. Revision of salaries was inevitable, and with adequate and undocked salaries the sanitary inspectors would be able to look forward to well-earned pensions. With these improvements in position and prospects would come the obligation that only the right stamp of men should be selected. Education and experience, with a diploma by a recognised body, would be required.

Referring to reconstruction, Sir James said: "In no department of our affairs will reconstruction be more thorough than in all that relates to sanitation. The men who have passed through the furnace of the war will come back to us refined in many respects, and in no way will they show their altered temper more than in demanding better health protection than they have heretofore enjoyed. They have learnt some salutary lessons. Statistics, perhaps, do not appeal to them, and they might remain cold to the statement that in three years amongst 3,000,000 men on our Western Front we have had only 2,000 cases of typhoid fever, instead of the 300,000 which, according to precedent, we should have had. They have not relished chlorinated water, and have grumbled because it spoilt the taste of their tea, but they have come to realise that it is preferable to diarrhœa and dysentery, and have been impressed by the strenuous efforts put forth under all circumstances to protect their drink from contamination, and so will be reconciled to the water-rate, and look after the cistern and the kettle when they return home. They have had a new insight into entomology conferred on them, and have been taught the disease-carrying propensities of the flea, the louse, the mosquito, and the fly in connection with the plague, typhus and trench fever, malaria, and various intestinal disorders, so that henceforth they will cheerfully take part in the crusade for the extermination of these dirty and irritating pests, and will protest against the existence of breeding-beds for one of them—the fly—in proximity to their dwellings. They will appreciate as they have never done before the utility of hygiene and of medical science, and regard with increased respect the doctor and the sanitary inspector."

OFFICIALS AND COUNCILLORS.

CHICHESTER WATER INSPECTOR'S RESIGNATION.

At the meeting last week of the Chichester City Council, the question of the resignation of the water inspector, Mr. Shoesmith, was raised by Councillor Follett, who, as reported in the *Sussex Daily News*, asked whether the water inspector's version of what took place respecting his resignation was placed before the Sanitary Committee. If councillors exceeded their duties, and those things were to go on, and the council lost its best men, they could not expect the surveyor to do his work satisfactorily.

The Mayor: He resigned formally.

Alderman Holt said he had seen the inspector (Mr. Shoesmith) three times to ask him to withdraw his resignation before it came before the council, but he said he could not overlook the circumstances which had caused it. The committee, therefore, could not help themselves.

Councillor Follett: We are entirely wrong. He was asked to apologise, but he had nothing to apologise for.

Alderman Holt: He was not asked to apologise.

Councillor Butler: To whom was he asked to apologise?

Councillor Follett: I will tell you—Councillor Bottrill.

The Mayor, being pressed for an explanation, intimated that Councillor Bottrill, on seeing the water inspector talking to the signalman in the signal-box at Southgate, asked him whether he could not be better employed, or words to that effect. Mr. Shoesmith said if he had any complaint to make he had better make it to the surveyor. Mr. Bottrill went to the surveyor's office, but the surveyor was on holidays. On returning home, Councillor Bottrill was followed by Mr. Shoesmith, who, Councillor Bottrill said, used language which, to say the least, was not Parliamentary. It was only fair to Mr. Shoesmith to say he had gone to the signal-box in the proper execution of his duty.

Councillor Butler: On that explanation I don't think there is much the matter.

The discussion then ceased.

American Municipal Engineers' Salaries. — Difficulties arising from depleted staffs are increased, several city engineers report, because of the low salaries paid. If this were due to war economy few would complain. It is not. Instead it is chronic. Not for twenty years, the city engineer of Chicago writes, have salaries been raised in his department—and the city council refuses to meet the present emergency. From Pawtucket comes a similar if not so deplorable a story. To continue such a policy will prove suicidal.—New York *Engineering News-Record*.

Councillor and Coal Rationing Administration.—At the last meeting of Carlisle City Council the minutes showed that a local Fuel and Lighting Committee had been appointed, and that Mr. H. C. Marks, city surveyor, had been appointed local fuel overseer. Mr. H. K. Campbell, a member of the committee, said he felt in a very humiliated position, because the administration of coal rationing was largely taken out of the hands of the committee and placed in the hands of officials.

Points Arising in the Pursuit of Town Planning.

By A. HORSBURGH CAMPBELL, M.INST.C.E., Burgh Engineer, Edinburgh.*

Eight years' experience of the author in the active operation of the Housing and Town Planning, &c., Act, 1909, has revealed its minor deficiencies as well as its acknowledged excellences. That the Act possesses both these qualities all its students who have been endeavouring to put its provisions into practice are well aware, and this is not to be wondered at. It was an entirely novel piece of legislation, inspiring in its vision and bold in its aims; yet it has suffered much delay in its operation by conditions that have retarded its easy translation into the language and act of practical town planning. Up to the present, it may be stated, the schemes which have been passed in England (some six or seven in number, and, alas! not yet one in Scotland) have been in their nature necessarily experimental. All honour to those pioneer authorities, such as Birmingham and Ruislip, who have not been afraid to launch out upon the contentious currents of the many opposing interests that come to the surface on the appearance of actual town planning.

But the foundations of this work having been so courageously laid by these and other authorities, it now lies to the hand of that great body of local government throughout the country to take up determinedly this work; it is pre-eminently a work suited to war-time, so that when peace shall come it will find the country prepared with those schemes upon which that great housing structure foreshadowed by the Government can be fitly reared. Unless this is done we shall find our cities, our towns and urban districts as unprepared for peace as our nation was in 1914 unprepared for war. And here the author may be pardoned a word of appeal to the membership of this institution—particularly the younger section—to realise the great boon which the Town Planning Act can bring to our individual cities, towns and districts, and that in great part without money and without price. I mean by that, without the payment of any price as compensation for provisions of such priceless worth in city, town and district development as in the language of sec. 59—2 of the Town Planning Act, enacting that:—

> "Property shall not be deemed to be injuriously affected by reason of the making of any provisions inserted in a town-planning scheme, which, with a view to securing the amenity of the area included in the scheme or any part thereof, prescribe the space about the buildings or limit the number of buildings to be erected, or prescribe the height or character of buildings, and which the Local Government Board, having regard to the nature and situation of the land affected by the provisions, consider reasonable for the purpose."

This may not inaptly be described as the "Magna Charta" of urban development. It puts in the hands of local authorities such powers, such opportunities of negotiation in their relations with landowners as no other piece of legislation (public or private) has conferred.

The new circular letters upon the national housing policy of the Local Government Boards for England and for Scotland are calls to action in the field of town planning, for, unless the housing schemes are preceded by well-considered, carefully-matured schemes of town planning, then delay and disorder will result, and grave mistakes develop in the work of housing, which the skill and forethought of town planning can successfully avert. But at least two discouragements are present to the enthusiasm and initiative of municipal engineers and surveyors in their pursuit of this work, particularly in the smaller and less populous boroughs and districts. These are—(1) The stirring up of local hostility and opposition, and (2) lack of recognition. These two are in reality one, for if the arduous and long-sustained labour involved by town planning is to go unrecognised by the authority for whose sole advantage it is intended, and at the same time hostile currents to be set in motion against those unfortunate officers mainly responsible for town planning, what inducement is there for them to see this business through? This initial handicap to town planning has been frankly faced and admitted by the Royal Commission on Housing (Scotland), who in their report, recently issued, state in paragraph 82 as follows:—

> "We recommend that conditions similar to those we propose for medical officers of health and sanitary inspectors should apply to burgh engineers, burgh surveyors, masters of works and town planning engineers—viz., that their appointments and salaries should be subject to the approval of the Local Government Board; that they should not be removable from office except by or with the sanction of the board, and that the board should have power to require combination of local authorities for the appointment of such officers."

THE LACK OF RECOGNITION.

The labourer is worthy of his hire, whatever may be the sphere of his labour. In no sphere of local government will the practical results be so positive and direct as in that to be gotten from town planning. What are some of these direct advantages? Improved amenity, the orderly lay-out of the town or district or suburb, good roads, transit facilities created and developed, better homes, improved chances for infantile life, and in the result a markedly improved physique and social tone, and with these a reduced mortality rate and enhanced public health are among the immediate positive benefits conferred by town planning. Municipal engineers become then the vanguard of a new constructive *régime* of health and amenity. It is therefore right that the officers and their staffs, charged with the duty of preparing schemes of town planning so potential of public benefit, and bearing as these officers do the burden of battle against vested interests, should be suitably recognised for this responsible appendage to the daily tasks of office. For such good and valid reason, then, representations should be addressed to the Local Government Boards for both England and Scotland in support of the recommendation of the Royal Commission, above quoted, that they may do their part in seeing that this specialised technical skill and service, which the municipal engineer and his staff alone are able to give, are adequately recognised.

But whatever may be the results personal to the officers concerned and their staff, that keen sense of personal service to the community they serve will continue to be the mainspring of their initiative in the pursuit of this all-important work of town planning for the betterment of their city or area.

Now, to come to some of the actual points of town planning, it may be well to make a very brief survey of town planning, and to know exactly what it does and does not include.

WHAT TOWN PLANNING INCLUDES AND DOES NOT INCLUDE.

It has been said that town planning includes "anything that the local government may choose to admit within the clauses of a scheme." This is correct only to a point. Town planning provisions must not be *ultra vires* of the general statute. They must be consistent with and yet limited by the terms of the statute. Thus, by way of illustration: (1) You may restrict the number of houses or buildings per acre upon any piece of land—thereby creating an open plan of development—but it is doubtful whether you may say that any particular piece of land shall be left unbuilt upon and reserved as common, or as recreation ground, or even as allotment land, except by consent, or by compensation. (2) You may say that a factory shall not be built upon any particular piece of land; you may not say that any particular site—however suitable and enticing from the points of view of convenience and amenity—shall be reserved as the site of a school, a church, or a public building, such as befits the prominence of particular sites for any such particular function, and which would make its contribution both to convenience and amenity. (3) You may plan your arterial roads along lines, and of widths and formation, consonant with convenience and amenity; it is doubtful if you may exceed the widths recognised by local or public statute or by-law, except by consent or compensation. (4) You may "town-plan" a piece of undeveloped land in the country; it is doubtful if under "town planning" you may replan an overbuilt and congested area in a town. (5) You may require the width of a road to bear its due relation to the height of buildings which will front it, but it is at least open to question how far you may require the lay-out of estate roads upon a plan that expresses art and amenity; in short, while controlling many matters less important, you are inadequately equipped in ensuring the greater things that do contribute so much towards convenience, amenity, health, utility, and the ordinary pleasures of domestic life.

These are but a few illustrations of certain anomalies that turn up in the course of preparing town-planning schemes, and show the need there is for amplification of the Act, or for its more liberal interpretation, so that town planning in its legal sense and expression will become as spontaneous as its practical exponents would exhibit it in material form, embodied in the settings of avenue, house, garden, allotment, play-fields, and other attributes of suburban development. Fortunately, however, the legal exponents of town planning—scenting its atmosphere—are beginning to realise its freedom and elasticity and are now disposed towards extreme simplification of a town-planning scheme in the first instance, reserving the "infilling" of details as regards any piece of land until it is maturing for building development, so that we may now have within one and the same "area" the super-imposing at a later date of a detail scheme or schemes upon an earlier skeleton scheme previously made—that is to say, the same piece or area of land may be the subject of two or more successive and supplementary schemes, the second (and it may even be still later ones) being but the carrying on as items of detail development of the first and earlier scheme or schemes. This point is very clearly

*From paper presented at the annual meeting of the Institution of Municipal and County Engineers.

brought out in the annual report of the Local Government Board for Scotland, 1917. . . .

The conference may here note that all the Act requires is that the local authority should satisfy the board that there is a *primâ-facie* case. A *primâ-facie* case for what? For showing that a piece of land is "in course of development, or appears likely to be used for building purposes." This issue surely is a simple one—not of argument, but of fact; not of policy, but of practice; not of subtle legal quibble and the rival proof of experts arrayed against each other at a formal inquiry, but of simple discernment of the facts as they appear to the eyes and judgment of a skilled practical commissioner or inspector such as the Local Government Board appoints to report to them. It is in this procedure stage that the Act seems almost to break down in its operation, and it is important to note that the procedure regulations, although deriving their power from clause 56 of the Act, are not a compulsory appendage of the Acts, but are in their form optional or permissive upon the Local Government Board, and they are the product of the Local Government Board and not of Parliament.

It is agreed that some simple regulations are necessary to secure the orderly and smooth working of the Act, but not to smother it.

The Procedure Regulations which the Local Government Boards of England and of Scotland have drawn up and the abuse or licence which, under cover of these regulations, opposing interests have set up in this preliminary procedure, are together strangulating progress and so cumbering the Act that its usefulness is seriously impaired if not indeed threatening to reduce the Act to comparative nullity.

If the Act be followed in its straightforward provisions the need for amendments is limited to points of detail and not of principle: it is the complete rescission of the existing Procedure Regulations that is wanted, and the substitution of a shortened code of regulations in harmony with the simplicity and spirit of the Act itself, so that the duty of satisfying the board that "land is in course of development or is likely to be used for building purposes" may be treated as a question of fact and of practice in as simple, expeditious and inexpensive a way as the simplicity of the issue justifies. And here may I suggest to the membership of this institution, which has taken the most prominent and leading part in the pursuit of town planning, the desirability of approaching the Local Government Boards for the two-fold purpose (1) of co-operating with the boards in the drafting of an amended and simplified set of Procedure Regulations suited to the need of the times and of the issue; and (2) of co-operating with the board in the drafting of a set of "General Provisions" forming the fourth schedule of the Act. It is more than time that such a set of "General Provisions" should be prepared for the guidance in particular of the smaller local authorities, and the cumulative experience of those authorities who have been active in town planning work should now be co-ordinated and placed at the disposal of the two boards.

The views of this conference upon this proposed simplification of the working of the Act are desired, and would prove helpful to the cause of town planning at this critical juncture of its administration.

The Procedure Regulations are big enough to form the subject of a separate paper, but it will be agreed that their suitable amendment can be best carried through by the co-operation of Select Committees for England and for Scotland, representative of town and district clerks with engineers and surveyors acting conjointly and in an advisory capacity with the officers of the two boards in the drafting of amended regulations and preparing the draft of a set of "General Provisions."

This is no innovation, for in recent practice upon other subjects of a technical kind the great departments of State have called to their aid the co-operation of men skilled in particular subjects to advise them. And that is what is now respectfully submitted as a suitable and simple means of expediting procedure in this most pressing work of town planning.

"TAILINGS" OF A CITY.

In all cities there are many fragments of land, the development of which has stopped short due to the ordinary processes of ebb-and-flow of building enterprise before the war. These fragments of land are probably in many cases isolated patches, although in the aggregate they may count as considerable tracts of territory justifying the application to them of town planning powers and provisions.

It is, of course, open to all local authorities to include all such "tailings" or fragments in a scheme, but unless the "procedure anterior to the making of a scheme" is very much simplified as above indicated, the difficulties in the way of such grouping and embracing in one scheme all isolated patches or "tailings" are very considerable, with the result that these fragments of land may remain immune from the operations of town planning and will thus be on a privileged plane compared with "virgin land" with the same local government area which may be put under the restrictions of a town-planning scheme. To leave out here and to include elsewhere in the same area would be inequality of treatment, importing preference which is not right as between land-owning interests in the same district, nor indeed to the district itself.

As an alternative to this course of procedure for these unbuilt-on remnants of estate development, it may be expedient to enact by statutory provision in any amending legislation which will probably be introduced consequent upon the Government's new housing proposals that all such land within the area of any local authority as is unbuilt upon shall in respect of its proximity to developed territory be *de facto* land subject without any "anterior" procedure to the provisions of sec. 59—2 of the principal Act and to the confirmation of the Local Government Board. May this point not be advanced further? And I suggest that if this form of treatment could be extended by law to embrace all urban and suburban territory without the cumbrous preliminaries that now hinder town planning, it would be but a logical step forward in the planned and orderly development of cities and of urban areas. It would likewise satisfy the case of old and congested built-up areas in need of clearance and of re-planning, and which, in the words of the Royal Commission, should be brought under the application of town planning, where such areas are "unsatisfactory on account of their age, their initially unsatisfactory planning, or which are of an insanitary or unhealthy kind."

ACQUISITION OF LAND FOR TOWN PLANNING.

For the manifold purposes of town planning the essential want is land. It may be for the formation of new or for the widening of existing roads. It certainly will be for the creation of those great housing suburbs under State and municipal auspices. These carry in their train the requisite of land for schools, churches, libraries, baths, pleasure-grounds, play centres for child-life, and last, but not least, for garden allotments which have come to stay.

The Royal Commission on Housing (Scotland) have given in this, as in other points of reform, a splendid lead to legislation upon this question. Their summary of recommendations and suggestions contained in Chapter 24 of their Report forms a compendium of statesmanlike grasp of the problem—fearless and businesslike in its way of combating the prejudices attaching to this problem of land values. . . .

These recommendations may to the Southerner appear somewhat drastic and revolutionary, but in their application to the Northern Kingdom with its tenemental and feuing traditions and the enormously inflated values which that system creates, the recommendations are most welcome and opportune.

CONCLUSION.

The following re-statement in summary of the points that have been here discussed may now be desirable. They are:—

(1) That this war-time is our work-time for the preparation of town-planning schemes as the essential preliminary to housing.

(2) That the Local Government Boards should recognise the responsibility of those who thus labour in the cause of public health and entitle them to recognition by the State in manner and form advised by the Royal Commission on Housing (Scotland).

(3) That preliminary procedure to town planning should be greatly simplified and shortened, and thereon the Local Government Boards of England and of Scotland should be memorialised; towards this end it is suggested that advisory boards of practical technicians in town planning might be constituted upon the invitation of the Central Authorities to co-operate with their officers in this work, and in the drafting of a set of "General Provisions" as model clauses for town-planning schemes.

(4) That amending legislation be introduced to bring all undeveloped building sites in urban areas within the scope or operation of town planning, without the necessity of establishing in relation to them a *primâ-facie* case.

(5) To deal with old or over-built or badly planned areas in cities as town-planning areas, and to supply the provisions of the Town-planning Act to their clearance or to reconstruction on approved town-planning lines.

(6) To facilitate the acquisition for public purposes (particularly housing and town planning) of lands and heritages in manner as advised by the Royal Commission on Housing for Scotland.

Public Service Posts for the Disabled.—On the receipt at the last meeting of Worcester Town Council of a communication from the Ministry of Labour urging the appointment of men disabled by war service to vacancies on the staffs of municipalities, subject to the reinstatement of previous employees who had served, the mayor said he thought that the committees and officials would bear in mind the claims of such men, and give them a preference. After the war their own servants would be coming back, and after them they would give precedence to the disabled.

Institution of Municipal and County Engineers.

MEETING AT BRIDGWATER.

An institution meeting, arranged by the South-Western District, was held by the Institution of Municipal and County Engineers in the Borough Police Court at Bridgwater on Saturday last. Mr. T. W. A. Hayward (Battersea), president, was in the chair, and there were present Messrs. H. T. Chapman (Kent), T. Moulding (Exeter), F. Parr (Bridgwater), D. Edwards (Taunton), J. Parker (Hereford), R. M. Stone (Devon), J. Siddalls (Tiverton), G. Alves (Glastonbury), H. M. Alves (Glastonbury), T. Orchard (Clutton), H. Sunderland (Mid. Norton), S. S. Orchard (Taunton Rural), T. Goldworthy (Taunton Rural), F. S. Coburn (Langport), C. Pursey (Wells), G. Ponsford (Exmouth), A. Warren (Devon), O. W. Berry (Wells), E. H. Knapman (Wincanton), and L. D. Thompson (Cornwall).

Alderman Sully, in receiving the institution, explained that the mayor was unable to be with them, as he was away from Bridgwater enjoying a much needed and well earned holiday. The mayor asked him to receive them and give them a hearty welcome to their ancient borough. He was sorry to hear from Mr. Parr that the numbers at the meeting were not so large as was expected. They had an idea that the reason for that was the new Fuel and Lighting Order. He hoped their deliberations would be pleasant to them and fruitful of practical results.

The President thanked the deputy-mayor for the welcome he had given to them as an institution. He first visited Bridgwater twenty-six years ago to see the manufacture of the celebrated bath brick. He had only learned that day that this brick was invented by a gentleman of the name of Bath. It was a wonderful thing how the material accumulated by Nature in their river was utilised for the manufacture of that useful article. They were looking forward to a good day from both an educational and social point of view. His experience was that when any new Order came along and the council found themselves in a difficulty, they said the surveyor was the man to do that. Extra duties—especially if they were without pay—were pushed on to the surveyor. They considered the borough surveyor was a man who deserved to be recognised as much at the pay table as at the office table. The Government had said that the borough engineer was to be the man to be the fuel overseer and that the work should be paid for. This was a personal payment to the surveyor. As municipal engineers they had to thank the Government for giving the local authorities a fine lead. He was pleased that Mr. Parr had been elected chairman of the South-Western District. Mr. Parr had done very good work in Bridgwater, and he hoped the council fully appreciated his value.

Alderman Sully said no words were necessary from him to express the council's appreciation of Mr. Parr. The best mark of appreciation of a good man in their service was to give him all the work they could. That building stood as a memorial of Mr. Parr and his work. They had a good servant in Mr. Parr and they showed that by putting all the work upon him they possibly could.

The meeting then adjourned, and the members made visits to the cement works of Messrs. John Board & Company at Wylds and the Castlefield brickworks of Messrs. Coulthurst, Symons & Company.

Following the visits the members were entertained to luncheon at the Clarence Hotel by Councillor Goodland, who presided.

The President proposed the health of Councillor Goodland, who briefly acknowledged.

Mr. J. Parker (Hereford) proposed the health of the new district chairman, Mr. Parr, and the district secretary, Mr. D. Edwards, of Taunton, who responded.

In the afternoon the meeting was resumed at the Borough Police Court under the presidency of Mr. Hayward, the following paper being submitted for discussion:—

MUNICIPAL WORKS IN BRIDGWATER DURING THE PAST TWENTY-EIGHT YEARS.

By F. Parr, assoc.m.inst.c.e., Borough Surveyor.

The author's experience of Bridgwater commenced in August, 1891, and comparative statistics for 1891 and 1917 are now given:—

	1891	1917
Area	721	961 acres
Number inhabited houses	2,840	3,568
Population	12,383	16,802
Average number of persons per house	4·36	4·71
Birth rate	34·1	14·3
Death rate	17·03	13·9
Rateable value	£41,372	£67,186
Amount of rates	3/5	5/2
Total loan indebtedness	£39,791	£41,769
Amount produced by penny rate ...	£150	£250

The education rate is not included in the above.

HIGHWAYS.

The total length of the highways reparable by the council is about 12½ miles, and this length includes 4¼ miles of main roads, the total cost of the maintenance being repaid to the council by the Somerset County Council.

With regard to the main roads, the traffic for a town of the size of Bridgwater is particularly heavy; the whole of the main road traffic coming from Bristol to West Somerset and Devon passes through the town, and in addition there is the collection of local traffic for about 17 miles on either side of the river Parrett, the only means of connection being Bridgwater bridge.

The maintenance of the roads—especially the main roads—has always been a question of much interest to the council, and various proposals have from time to time been considered and some few adopted with varying success.

The great desire of the council has been for many years to pave Eastover, the bridge and Fore-street with wood; but the heavy cost, combined with disturbance of business, has hitherto acted as a deterrent. Previous to the introduction of mechanical traction our roadways were maintained with granite for the principal roads, stone from Devon and South Wales for other main roads and such highways other than main subject to heavy traffic, while local limestone was used for all other roads. A reference to some of our records for 1906 show that Guernsey granite cost about 3s. 2d. per yd., Devon and other granites 2s. 3d. per yd., and limestone 1s. 8d. per yd.

Then for some years came tarred macadam. Many of the roads were, when necessary, relaid with granite mixed with tar, the extra cost of the mixing running to about 3s. 2d. per ton. The work when laid down in the street cost about 2s. 5d. per yd. This treatment was not altogether successful, some roads standing well, others breaking up after a few months' wear. One explanation of the failures was the excessive contour of the old roads, which has been reduced as much as possible during the last few years.

Fore-street was coated with Tarmac in April, 1917, at a cost of about 4s. per yd. This included a certain amount of foundation work in a portion of the street where there is always trouble. A considerable section of Eastover was recoated with the same material at a cost of 2s. 10¼d. per yd., the foundation and the removal of the old material accounting for the difference in cost. Tarmac, I may say, costs 20s. per ton in the corporation depot.

Other roads in the borough have been maintained with water-bound granite, the cost of which has lately increased to about 2s. 6d. per yd., and the surfaces have every year been "painted." This work is executed with granite chippings ½-in. gauge which costs the council 10s. per ton in the yard. The tar is painted whilst hot, and the cost runs out at from 1⅞d. to 2⅛d. per yd. It is all done by hand labour, the only objection to this being the length of time occupied and to a certain extent the cost.

PRIVATE STREET WORKS.

The council adopted this Act in the year 1900, and since then fourteen streets have been taken in hand and put into proper repair at a cost of about £3,576; but in addition to this a considerable number have been constructed by private owners in opening out land for building purposes.

PAVING.

The paving of the footpaths is in a state of transition and suspended animation. As the blue lias stone paving gets beyond general repair it is taken up and cement concrete substituted, the process being to remove the old paving with the ground under, to a depth of 6 in., lay down a foundation of broken brick or stone 4 in. deep, well roll this and fill up the interstices with sand or chippings and complete the path with a paving of Portland cement and granite chippings in proportion of 3 of chippings to 1 of cement, laid to a depth of 2 in. The average cost of this work used to be about 4s. per yd. sup., but it has now risen to 6s. 6d.

DRAINAGE.

The town is mostly drained by means of brick-built sewers, but on all new works the materials used are either concrete tubes or glazed stoneware pipes. The low-lying level on both sides of the river presents difficulties in obtaining adequate fall for self-cleansing inclinations, making the principal consideration to be observed the point of discharge into the river.

Various extensions have been executed from time to time at a cost of about £9,500. In the Taunton-road district extraordinary difficulties had to be overcome. The trench was about 14 ft. deep, and directly after the uncovering of the top earth about 6 ft. down it was discovered that the site has many years before been filled up with deposit from the river, which after all these years had remained in a wet

condition. Soundings proved that this condition continued to about 20 ft. in depth, and the method taken to overcome the difficulty was to drive a series of piles about 6 ft. apart throughout the line of the trench, and on these piles cross-heads were fixed which in turn supported rough elm planking. Cement concrete was then used on the planking, on which the pipes were laid.

Although the work was executed in 1898, no trace of any settlement has yet been detected.

WATERWORKS.

The water supply is taken from three main streams which have their origin on the eastern slopes of the Quantock Hills at an elevation of about 600 about 9 to 10 miles west of the town. They flow down through cultivated country until the point of junction is reached at the site of an old mill, from which the streams flow on until eventually discharged into the river Parrett.

The present waterworks consist of a pumping station with settling tank and filter beds at Ashford, and a service reservoir of 600,000 gallons capacity on Wembdon Hill about one mile from the town, and from which the town and district are supplied by gravitation. Provision is made for the higher parts of the district by a breeches or stand-pipe, the water being obliged to pass over this to enter the reservoir.

Not only the town, but a considerable portion of Bridgwater without and Wembdon are also supplied by the town council's main, so that a population of about 18,000 is supplied by the works.

The pumping plant consists of two Lancashire boilers 18 ft. by 6 ft., and two beam engines constructed by the firm of James Watt & Co., of Birmingham. They work at a pressure of about 10 lb., and hitherto have cost very little for repair. Each engine and pump is capable of raising about 375,000 gallons per day of 24 hours, and the fuel consumption amounts on the average of the last four years to 356 tons—practically 1 ton per day.

In the year 1896, owing to the excessive consumption and to ease the works on the pumping engines a set of auxiliary pumps driven by a turbine were installed, and these, when only one pumping engine is at work, account for about 50,000 gallons in the 24-hours' day.

The consumption for many years went up to about 35 to 38 gallons per head, and in order to check this the greater part of the town was placed under the district meter system, the first effect of which was to reduce the consumption to about 22 gallons per head, and this figure was continued as long as an inspector was employed, since when the consumption has gradually increased until the average may now be stated at about 27 gallons.

OPEN SPACES.

In the year 1900 the council purchased an old residence and garden on the west bank of the river, and in addition several pieces of waste land, containing altogether about 3 acres, the whole of which has been laid out and now joins the Blake Gardens. The principal work consisted of the joining up of the original garden and the newly-purchased pieces by covering in the outfall to the Durleigh brook with a brick-built culvert 6 ft. in diameter, finished with a wall and balustrade facing the river, and the making good of the promenade bank after being washed away for a length of about 150 ft. by fascine work, bundles of thorns about 6 ft. in length and 14 in. diameter being laid in a trench at an angle of from 25 to 30 deg. from the horizontal and carried up to about the height of h.w. neap tides. As each layer of faggots was laid in, it was covered with a thick layer of the deposit from the river and well stamped in. The work was executed at the cost of about 14s. 6d. per ft. The approximate amount of earth moved was 576 cub. yds.

The land for a recreation ground was acquired in 1893, and consisted of about 10 acres out of 12 of an old disused brickyard. The council at once commenced to fill in the site partly by the deposit of the town's refuse and partly by admitting the tidal waters of the river Parrett; the effect of this over one area of about 3 acres was that in about eighteen months the pits were filled up to a depth of 25 ft. Above this point the tidal waters were of little or no use, and then long wide trenches were dug in the deposit, the material was thrown up on either side, and the river water again admitted. Sufficient of the river deposit was placed on one side to form a covering over the whole surface, and now the place has been in active use for about six years.

ALLOTMENTS.

The provision of allotments has for some years involved a lot of work on the Allotment Committee of the town council, and considerable difficulty has been experienced in obtaining land suitable in price to let at reasonable rents, probably for the reason that, owing to the large sheep and cattle market, land in the immediate vicinity of the town is eagerly sought after.

TOWN DEPOT.

These buildings were erected at a cost of £1,540 from plans prepared by the author. The accommodation includes a fire station, cart shed, mortuary and post-mortem room, roller house, stores and workshop for the water department, and considerably increased stable accommodation. In addition to this there are offices for the foreman with several store rooms for various materials.

THE RIVER.

Any account of municipal works in Bridgwater would not be complete without some mention of the tidal river which runs through the town. The author's work in connection with it has not been very much, consisting only of the fascine embankment to the Blake Gardens, other fascine work just below the docks where a great wash-out of the western bank occurred, and a scheme for the improvement of the navigation, in conjunction with the late Mr. W. H. Wheeler, of Boston, who confirmed the main idea of the author that this improvement would be better gained by means of two cuts between Bridgwater itself and Pawlett, thus straightening the river as much as possible rather than by a process of what was called rounding off the bends. The author had charge of the preparation of the longitudinal section of the bed of the river between Bridgwater and Burnham, about 14 miles, the tidal diagrams and also the Parliamentary plans and references under Mr. Wheeler's guidance, and it was with great regret to us both that the scheme was ultimately abandoned owing to an adverse vote of the town. The causes for this were many, but the principal one was no doubt the heavy cost, estimated at about £100,000, and the fear that such a straightening of the river would seriously interfere with the bath brick industry—one of the staple trades of the town. The only further remark I would make is that the solid matter contained in 1 cub. ft. of the river water amounts to 680 lb. taken on a 12-ft. tide at Bridgwater, or about 2,873 tons in 1 mile of water.

(To be concluded.)

MIDDLESBROUGH MEETING PROGRAMME.

The following is the programme of the meeting of the Institution of Municipal and County Engineers, which is to be held at Middlesbrough to-day and to-morrow, the 20th and 21st inst.

TO-DAY.

Meeting at the Town Hall, Middlesbrough.

2.0 p.m.—Business meeting of the institution.

2.15 p.m.—Welcome by His Worship the Mayor of Middlesbrough (Councillor Joseph Calvert, J.P.), town clerk, and members of the Middlesbrough Corporation.

Plans and drawing of local works mentioned in the following paper on view.

2.30 p.m.—Public works in Middlesbrough, by Mr. S. E. Burgess, M.INST.C.E., &c., borough engineer and surveyor, Middlesbrough.

Afternoon tea, at the invitation of the Mayor and Mayoress, in the Town Hall at the close of the meeting.

4.15 p.m.—Visit by motor *char-à-banc* to works mentioned in the paper—as follows: Snowdon-road new pumping station (£35,000, including 6-ft. main sewer)—drainage area cartoon will be shown; Boundary-road (Aberdeen Flats paving); new laundry at Sanatorium (£3,150); new tuberculosis pavilion at sanatorium (£3,200); Acklam-road (main road widening to 60 ft.). Tarmac, &c.; Cambridge-road (tar-grouted), Orchard-road, Phillipsville Estate—marginal Tarmac, &c., roads; Bush-street (Crossley's Vitrified brick paving), Park-road North, Park Vale-road (allotments), Park-road South (Whin paving marginal road), Marton-road (60 ft. widening and paving), Clairville-road, Southfield-road, Linthorpe-road (wood paving to Town Hall).

TO-MORROW.

9.30 a.m.—Special tram cars will leave the Town Hall for the Middlesbrough Transporter Bridge. Inspection will be made and general description given of this structure. (Cost, £87,000.)

10.30 a.m.—Leave transporter bridge by motor cars for visit to the Middlesbrough works of Tarmac Limited, at the Ackland Steel Works. Slag Tarmac of various ganges is turned out. Process of manufacture, testing and other technical details will be explained. Light refreshments provided.

12.45 p.m.—Return to town.

BARRY AND PENARTH MEETING PROGRAMME.

The programme of the meeting of the Institution of Municipal and County Engineers to be held at Barry and Penarth, on the 27th and 28th inst., is as follows:—

FRIDAY, SEPTEMBER 27TH.

11.0 a.m.—Reception at Council Offices, Barry, by the chairman (Mr. George Wareham, J.P.) and members of the Barry Urban District Council. General business

and discussion of the following paper by Mr. J. C. Pardoe, A.M.INST.C.E., engineer and surveyor, Barry: "Municipal Works in Barry during the past Thirty Years."

1.0 p.m.—Luncheon at the Barry Dock Hotel, by the kind invitation of the chairman and members of the Barry Urban District Council.

2.0 p.m.—Inspection of Barry Docks, by kind permission of Mr. T. H. Rendell, general manager, Barry Railway.

5.0 p.m.—Afternoon tea at the Marine Hotel, Barry Island, by kind invitation of Mrs. J. C. Pardoe, O.B.E.

SATURDAY, SEPTEMBER 28TH.

10.0 a.m.—Meet at Council Offices, Barry. Proceed to inspect works mentioned in the paper, including Barry Garden Suburb.

1.0 p.m.—Luncheon at Barry Dock Hotel at a charge of 2s. 6d. per head (optional).

2.0 p.m.—Proceed in brakes to Penarth. Inspect works at Penarth. Inspect Penarth Cement Works, by kind invitation of the management. Afternoon tea.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is it not evident that the experiments carried out since 1915 at the Toronto Sewage Disposal Works, as to the fertilising value of activated sludge, have proved the great value of this description of manure for certain crops? When we read, *inter alia*, that 37 bushels of wheat per acre were grown with land treated with this sludge as against only 13 bushels "when the equivalent amount of nitrogen had been added in the form of dried blood," does it not seem extraordinary that this valuable fertiliser should in many cases be wasted instead of being utilised to increase our food supply?

* * * *

Is it a fact, as stated in a recent issue of the *South Wales Daily News*, that whitewashing houses was first introduced at Newton Nottage at the time of the Plague, and that, as it was so successful, the same cottages are now regularly whitewashed to this day? Although it is not stated whether it is the interior or exterior of these cottages which is thus treated, is it not well-known that lime is an excellent deodorant and disinfectant? Would not one like to know the name of the genius who suggested this admirable scheme of whitewashing so long ago as the time of the Plague?

* * * *

Is it not about time that the Pontypool Urban District Council took some steps to enforce their closing orders against the owners of certain property in that town, when we read that these houses depended on their safety upon buildings below them and "these buildings in turn were only kept up by a few keystones"; also that "a drunken man with a pickaxe could loosen these stones, and if one house fell the whole lot of the houses would come down"? Does it not seem strange that although closing orders had been served upon the owners of these houses three years ago nothing had yet been done? Will it be necessary for a coroner's inquest to be held on some unfortunate tenant before this local authority take action?

* * * *

Is not a good example of some of the curious effects of the war provided by the recently published report of the Ordnance Survey Department, in which it is stated that "as the war goes on, if the revision still continues at its present diminished rate, the public must be prepared to use obsolete 25-in. maps of some of the most important counties of England"? Is it also a fact that owing to depletion of staff some of our county maps have not been revised for more than twenty years, and that we shall have to be content for a long time to come with obsolete maps and do the best we can with them? Will not this make the work of civil engineers even more difficult and arduous than it has been in the past?

* * * *

Is there not a well-known adage that "There are more ways of killing a dog than choking him with butter"? When we read that the Coal Control Department have received upwards of 3,000 letters containing suggestions and ideas for saving coal, surely the department will be able to issue shortly some instructions and advice of a practical nature in order that the public may be able to reduce the present wasteful coal consumption? What can be more wasteful of heat than some of our domestic grates? Could not many of them be improved by the judicious use of fireclay bricks or slabs of various dimensions and descriptions; and are there not hundreds of methods by which our present extravagance in the use of our "bottled sunlight" could be largely curtailed?

HOUSING NOW AND AFTER THE WAR.

WOMEN AND INTERNAL PLANNING.

It is announced that Mr. Hayes Fisher will give instructions to all the inspectors of the Local Government Board "that on the occasion of their visits and inquiries they should draw attention to the desirability of consulting women on the plans from the domestic point of view, not the architectural," of houses to be built after the war. Mr. Fisher is about to hold important local conferences on housing policy and plans, and women representatives of the working classes are to be asked their opinion on the internal arrangements of houses.

Private enterprise would not, said Sir James Crichton Browne in his presidential address at the annual conference of the Sanitary Inspectors' Association last Friday, extricate us from our difficulties with regard to housing, and State aid would be indispensable.

Chesterfield Town Council have approved plans for the erection of forty houses in St. Augustine's-road, and have completed the purchase of 63 acres of land at Boythorpe, where it is proposed to build not more than twelve cottages to the acre, with gardens instead of backyards.

At Birkenhead the Gilbrook estate has been planned for 299 houses, comprising 164 small three-bedroom dwellings, seven blocks of flats to contain 120 houses, and two blocks of fifteen shops. In the vicinity of Cammell Laird's works it is intended to provide fifteen self-contained houses with living-room, scullery, gas-boiler, bath, small yard and conveniences and two bedrooms, and thirty dwellings with the same accommodation, but with one bedroom only. It is proposed to instal a central hot-water system.

Easington Rural District Council Housing Committee have submitted a report in which they state that progress is being made with the acquisition of land for housing purposes. Certain landowners had offered land at £90 and £150 per acre, which they regarded as reasonable prices, and they express the opinion that in a rural district such as Easington no land ought to command more than £150 per acre. With respect to Wheatley Hill and Trimdon Foundry, where £726 per acre was asked, the council are invoking the help of the Local Government Board.

MOTORS AND MUNICIPAL WORK.

Newtownards Board of Guardians have decided to purchase a motor ambulance.

Manchester Electricity Committee have obtained tenders for a 3½-ton electric tipping wagon.

The Essex Standing Joint Committee have decided to purchase another motor car for the use of the constabulary.

Dundee Town Council Cleansing Committee have decided to obtain information with respect to the adoption of mechanical traction from Aberdeen, Birmingham and Glasgow.

Salford Town Council have accepted the tender of Mann's Patent Steam Cart and Wagon Company, Limited, at £1,045, for the supply of a 5-ton steam tipping wagon for the electricity department.

Halifax Town Council have appointed a special committee to consider the advisability of centralising the control of all steam and motor vehicles in the ownership of the corporation. Alderman C. F. Spencer, supporting the motion, said we were living in an age when waste would have to be eliminated, and the road question of the future was going to be one of the most difficult to tackle.

Notice of Removal.—In order to meet their requirements, the Casson Compositions Company, Limited, have purchased large additional works close to Paddington, on the Grand Junction canal, and have disposed of their premises at Hurlingham-road, Fulham, where goods will no longer be received. Consignments must in future be directed either to Colham Mills, West Drayton, or to the new wharf at Paddington. As the firm also require larger office accommodation, they have taken premises at 11 Craven-hill, Paddington, W. 2, which will be the new registered offices of the company. (Telephone No.: Paddington 3670.)

Hucknall's Sanitary Condition.—At the meeting last week of the Hucknall Torkard Urban District Council a discussion took place regarding the sanitary condition of the town. A report submitted by the Health Committee stated that voluntary abstention from work was the chief cause of the backward state of affairs, and added that "so long as we have to employ unsatisfactory and unpatriotic workmen, and so long as wages are so high that there is no necessity for the men to work all the week, so long would the cause go on." The members complained of scavenging being done during the day, but it was explained that it had become very necessary, and was the lesser of two evils.

THE CONCRETE ROADS OF WAYNE, MICHIGAN.

By W. S. Gilbreath.*

Wayne County believes that it has discovered the ideal highway material in concrete. Its ten years' experience, the mistakes made, the lessons learned, will be valuable in their suggestions to road builders elsewhere, and to that end we shall try to note them as briefly as possible.

We noticed before that the oldest piece of Wayne County concrete has now been in service for ten years. This piece of road, the north end of Woodward-avenue, shows hardly a particle of wear, in spite of the fact that a recent count showed that 11,044 vehicles of all classes passed over this stretch in eleven hours. This characteristic of permanence is amply borne out by the figures covering the cost of maintenance of the concrete roads of Wayne County.

The entire expense of tarring, repairing cracks and holes on 150 miles of concrete roads throughout Wayne County in 1916 was a little over $5,000·00, which works out at somewhat more than $33·00 per mile.

When the first experimental concrete road was laid down in Wayne County, the builders had certain definite advantages in view, though the material had never been extensively used in road construction. They knew that the first cost was comparatively low; they believed that the maintenance cost would also be small; they knew that this type of road would be free from dust, there being no detritus from the concrete road itself. In addition, the concrete surface would be comparatively noiseless—vehicles of all sorts would find traction good, and only a small crown would be necessary to get rid of the water. The Mayne County practice is to crown the roads by one quarter of an inch to the foot, which tends to distribute the traffic over a greater area of the road, instead of compelling it to follow a defined track or path.

The specifications of the original concrete construction called for a road in two courses, the bottom course 1-2½-5 mix, 4 in. deep of limestone, and the top or wearing course of 1-2-3 mix of crushed cobblestone 2½ in. deep, the whole being laid in sections of 25 ft., with varying forms of expansion joints. No more than twenty minutes was allowed to elapse between the laying of the two courses, so that a true bond would be effected between the bottom and wearing courses. The metal was 17 ft. 8 in. wide, with a minimum width between ditches of 24 ft.

In coping with

THE EXPANSION PROBLEM,

several kinds of experimental joints were employed. Two thicknesses of three-ply tar paper were used in some sections; a southern pine board ½ in. thick was used in others; a composition of asphalt, still wax and pitch was tried in still other sections, and in some places the edges were protected by an angle iron embedded in the concrete, and the space between adjacent sections was filled in with this composition.

Naturally the Wayne County builders have learned many lessons in their ten years' handling of concrete, and their methods have been greatly improved over those used in the first experiments of a decade ago. To-day much more care is used in the selection of clean aggregates and in securing a good mix. They are more careful in striking off and finishing the surface.

The first concrete roads built were of two-course construction, using crushed cobblestones for the wearing surface. Owing to the difficulty of obtaining a suitable supply of properly graded aggregates, in 1911 the County Road Commissioners standardised on the one-course construction, using washed and screened pebbles, washed and screened sand, with the same proportion of cement throughout its entire depth; difficulty was again encountered in 1916 in securing sufficient quantities of washed and screened pebbles properly to carry on the large amount of work planned, and the board again changed its standard back to two-course construction, using Wisconsin granite or trap rock for the wearing surface. Other things being equal, the board's preference is for one course construction. The difference in Wayne County shipping points at the present time in the prices of pebbles and of granite makes it prohibitive to build entirely of granite, as the pebbles cost $1·10 per ton, and the granite $2·60 per ton.

In summing up the improvements in method that have been wrought, the most important changes have been: The increase in the amount of cement used in the mix from 1-2-4 to 1-1½-3; a more stringent specification as to quality of stone and sand, especially with regard to its freedom from clay, loam and other foreign substances; an increase in the depth of the work from 6 in. or 6½ in. to not less than 8 in.; and finally, the standardisation of a protecting plate at the expansion joint.

The experience with an angle iron at the expansion joints proved so satisfactory that it has gradually been perfected and standardised in a soft steel plate ¼ in. thick and 3 in. wide, provided with shear members which tie it securely to the concrete base and wearing surface.

These plates are clamped to a dividing board shaped at the bottom to conform to the crown of the finished road and two thicknesses of three-ply asphalt felt about ¼ in. thick, cut the entire depth of the concrete, and inserted between the plates.

As to the actual construction method used, the subgrade is prepared and shaped, being rolled with a ten-ton roller. The concrete is laid right on the natural subsoil. Side rails of 2 in. by 7 in. lumber are used, and these are protected on top by a 2-in. angle iron. When the concrete has become sufficiently firm to permit removal of the rail, the finishers pare off the outer edges, which are formed next to the rails. This prevents a sharp division line between the concrete and the gravel shoulders. When first put down the concrete is thoroughly tamped in place, and after this is done no workman is permitted in any way to disturb the concrete by stepping in it or throwing anything on it. The strike-off men use a plank trimmed to the curvature of the road, and iron-bound on the edges.

Each day's work is finished up to an expansion joint, and no more than twenty minutes is permitted to elapse between batches during the day. The work of the day is covered with canvas, and the next day the canvas is removed, and the concrete covered with any sand or loose soil that may be available to the depth of about 2 in. to keep the concrete from drying out. The concrete is sprinkled several times daily for two weeks. Roads are not opened for traffic until at least four weeks after the last concrete is put in place. The gravel shoulders are put on in two layers, each 3 in. deep, and rolled with a 10-ton roller. This work is not started until the adjacent concrete is at least four weeks old.

In the course of its career the Wayne County Commission has found many ways of

SHORTENING AND OBVIATING LABOUR

which will be worth study by any highway body contemplating the use of concrete. For instance, water is pumped sometimes for miles by gasolene engines, so as to have it right at the job. The amounts of the various materials that are to be needed on any job are proportioned so carefully, and gauged so accurately, that it is seldom necessary to haul extra sand or pebbles, or what not, to make a properly proportioned batch of concrete. Cement is mixed in a mechanical batch mixer, which moves under its own power. From this mixer a boom projects, capable of being swung in a semicircle. The mixed material is dumped into a bucket, which is run out on the boom, and deposited on the road where it is wanted. Each batch of concrete is turned over sixteen complete revolutions, and remains in the mixer at least one minute.

In normal times the cost of concrete roads in Wayne County has varied from $1·04 to $1·75 per sq. yd. The variation represents the difference in cut and fill required, prices of materials, length of haul, &c. This is in spite of the fact that Wayne County is particularly poor in good road material, so that practically all the stone and sand used have to be shipped from a distance. The country is flat, and the drainage problem is bothersome and expensive, the subsoil being largely clay with occasional stretches of sand. The figures given include the cost of concrete culverts, concrete tile drains, land tile along the street car tracks, open ditches, grading, and the earth or gravel shoulders. Yardage is figured on the concrete only, other costs being apportioned over the concrete yardage, and added to its cost. Under present conditions the cost would be higher, labour and materials both contributing to that end, with transportation difficulties to be figured on.

Wayne County formerly built its trunk roads 16 ft. wide, with gravel shoulders 4 ft. on each side. Lesser travelled roads 15 ft. of concrete with a minimum over-all width of 24 ft. The county also has built concrete roads of 9 ft., 12 ft., and 16 ft. wide, but in 1916 the county adopted 18 ft. of concrete and 5 ft. shoulders, 28 ft. over all, as a minimum width for all roads to be built hereafter.

We who are in closest touch with highway extension in Wayne County believe that as time goes on the taxes realised from the increased values created in the county by its concrete road system will pay off the original cost of construction, and in the meantime maintain these roads at a high standard of excellence. In the interim the roads have paid the community handsome dividends in the way of decreased hauling charges, through ability to move larger loads and move them faster, in increased mileage for a given consumption of gasolene, in increased land values, and in added pleasure and satisfaction. These are the real justifications for improving our highways.

* From an article in the May number of *The Motor* (America).

Timber, &c.—Messrs. Jennings, Limited, Pennywell-road, Bristol, state that they have for sale 10,000 cub. ft. of second-hand timber. Their stock also includes in all kinds of sizes 5,000 doors, windows, stairs, mouldings, skirtings and new timber of all kinds. Surveyor readers are invited to call and inspect the stock, or to send stamp for sheets, or 1s. for fully illustrated list. The firm have also small quantities stocked at Leicester and Porthcawl.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Chester R.D.C.—A committee has been appointed to meet representatives of the Flintshire County Council with respect to the proposal to widen the bridge at Blacon Point.

REFUSE COLLECTION AND DISPOSAL.

Aberdeen T.C.—The Waste Collection Committee report of income and expenditure from May, 1917, to May, 1918, showed that, after meeting all expenditure, the committee had been able to hand over in that period a sum of £1,250 to the City of Aberdeen War Work Association, and £365 to the Aberdeen County War Work Association and the Aberdeen County Branch of the Red Cross Society. Since May last the committee had further augmented the City War Work Association's funds by a contribution of £345, and the county organisations mentioned by an additional £375. From the time they had started to run the waste paper department and old metal department for the benefit of those organisations, since July 9th, 1917, to date, they had paid to the City of Aberdeen War Work Association £1,595, and to the two county organisations £740, or a total of £2,335.

Falmouth T.C.—Having decided to undertake the collection of refuse in future, the town council have authorised the Sanitary Committee to spend £400 in the purchase of the necessary horses.

ROADS AND MATERIALS.

Blackburn T.C.—The section of highway from Montague-street to Saunders-road, which is described by the *Blackburn Weekly Telegraph* as "Blackburn's best road," represents the completion of the whole length of Preston New-road. The particular portion referred to is being laid down with Rocmac, whose lasting qualities are highly spoken of by the deputy borough engineer, Mr. J. T. Shield. Other portions are constructed of tarred slag.

Bromley (Kent) R.D.C.—In view of the increasing difficulty of transport, the council have approved the suggestion of the acting highway surveyor, Mr. Vawser, to obtain sand for next year's requirements in tar-painting.

Forfarshire C.C.—The County Road Board has levied increased rates for the maintenance of the roads in the various districts, and in the course of the discussion upon the matter Mr. A. F. Duke said the Dundee Committee had saved a lot of money through making use of machinery, the chairman (Mr. George M. Robertson) adding that the other committees would probably find it necessary to go in for machinery to a greater extent than heretofore.

Grimsby T.C.—The borough surveyor, Mr. H. G. Whyatt, has been instructed to prepare a plan of certain new drives which it is proposed to construct in Bradley Woods as part of a general improvement scheme.

Kildare C.C.—The county surveyor, Mr. J. Rorke, stated in his report that with the rise in prices and the stoppage of the Road Board grants expenditure on the roads would soon be double or more than double what it was before the war. He had recently in accordance with instructions purchased a machine stone-breaker, which had given satisfaction, and the council had now three stone-breakers, three steam rollers (one of which was convertible into a traction engine), a traction engine, and three tar boilers. The scheme for the improvement of the roads leading to the Curragh camp included the water-proofing of the new surface by tar-painting.

Littlehampton U.D.C.—The plan, specification and estimate of the proposed improvement of Wick High-street, with a view to its being ultimately taken over by the county council, having received the preliminary approval of the county surveyor, was ordered to be submitted to the Road Board with an application for a grant in aid of the estimated cost, £4,510.

Penmaenmawr U.D.C.—Reference was made at the council meeting to the danger arising from unstable rocks overhanging the Conway to Penmaenmawr main road at the point where it passes round Penmaenbach Point. The road belongs to the Carnarvonshire County Council, on whose behalf it is maintained by the urban district council, but the county council, after protracted negotiations, have refused to bear the cost of rendering it safe from falls of stone and earth. It was explained to Mr. Leveson Gower (of the Office of Woods and Forests) that the urban district council took a serious view of their responsibility. Mr. Leveson Gower said he would take the advice of the solicitor to the Department as to the responsibility of the Commissioners of Woods and Forests to remove the dangerous rocks from the mountain side, which is Crown property, and he also promised that if the commissioners were unable to assist, he would strongly support an appeal to the Treasury for a grant for this purpose.

Portsmouth T.C.—The town council have approved the recommendation of the Health Committee for the purchase of certain properties for the improvement of Voller-street.

Redruth U.D.C.—The council resolved to call the Urban Electric Supply Company's attention to the state of the footpaths in the town which had been broken up for wiring purposes and not properly restored. Mr. Hart stated that the work of restoration was formerly done by the council at the expense of the company, but when materials became unobtainable the company was asked to complete the work themselves. There was scarcely a sound footpath in the town.

Swansea T.C.—The Highways Committee recommend the paving of footpaths at an estimated cost of £200, and the paving of a portion of Bryn-road, at an estimated cost of £58.

SEWERAGE AND SEWAGE DISPOSAL.

Burton T.C.—The town council have approved the recommendation of the Farm Committee to carry out the cleaning of the sewage rising main, as suggested by the borough engineer, Mr. G. T. Lynam, and the engineer, Captain Sankey, and the borough engineer has been authorised to obtain pipes and plant at an estimated cost of £3,500. It was stated that when the proposal was made upon a previous occasion the Treasury refused to provide the money.

Dulverton R.D.C.—Mr. Cotterell, engineer, of London, has made an inspection with a view to preparing a scheme for the expansion of the drainage of Dulverton and suburbs.

Littlehampton U.D.C.—The council have approved a report and recommendation of the General Purposes Committee with respect to floods caused by the overflow of the river Arun. The surveyor, Mr. Reg. Booker, had been asked to report specially upon the recent overflowing during a heavy rainstorm at time of high tide. A suggestion by the surveyor for the erection of a temporary dwarf wall at the side of Pier-road to prevent the overflow of water from the river pending some final arrangement for permanent works, was favourably considered. Without in any way admitting responsibility by the council to undertake such works, and merely as a measure of protection for the people who live in the area liable to flood and who are helpless to do anything by or for themselves, the committee recommended that the concurrence of the estate office and of the Port Commissioners be sought with a view to the proposal being carried out at the earliest possible date.

Plympton R.D.C.—The council have informed the Local Government Board that it is intended after the war to proceed with drainage schemes at Plymstock (a scheme for which plans have been sanctioned), Roborough, Newton Ferrers, Pomphlett, and Yealmpton.

Wigan T.C.—Alderman Cheetham, in proposing the adoption of the minutes of the Sewage Disposal Committee, remarked that the milk supply was still going up, and during last month they had distributed 2,000 gallons. They had thirty-four beasts, and it was intended to increase them to forty-three before the end of the year, that being the limit of their accommodation. They were doing very useful work in connection with the milk supply.

WATER, GAS, AND ELECTRICITY.

Chepstow R.D.C.—The Water Committee has been asked to visit Caerwent with the object of taking measures to improve the water supply.

Dundee T.C.—It has been decided by the Water Committee to purchase from Lord Dalhousie an additional 120 acres of land in the vicinity of Crombie reservoir at a cost of £1,550, and also the timber in Peddieston and Fallaws Wood at a cost of £2,950, a total of £4,500, which, added to the committee's recent land transaction at Crombie, makes the gross sum expended for this purpose £28,000.

Ennis U.D.C.—A scheme is in course of preparation for the improvement of the water supply.

Hove T.C.—It was reported that there was a balance of £1,380 upon the electricity undertaking last year, compared with £745 in 1917.

Limavady U.D.C.—The surveyor, Mr. R. Marshall, reported that the town hall, which had been without a lighting system since last April owing to the closing down of the local gasworks, was now provided with a complete installation of elec-

tric light, and the cables would soon be attached to the poles erected in the streets for public lighting. The urban council invite tenders for the purchase of the gasworks plant in its entirety, in lots.

Padiham U.D.C.—The council contemplate carrying out waterworks extensions at Staniscombe.

Penzance T.C.—The borough surveyor, Mr. F. Latham, gave a satisfactory report with respect to the water supply, and said that no means other than stoppage of waste had been adopted for augmenting the supply since the borehole was partially sunk. Mr. Richards having remarked that the difficulty in connection with the town's own consumption had been solved by the borehole, the town council asked the Water Committee to prepare a report on the subject.

Plymptom R.D.C.—It is proposed after the war to proceed with water supply schemes for Newton Ferrers, Sparkwell, Pomphlett, and Yealmpton.

Salford T.C.—The Gas Committee have accepted the tender of the Holwell Iron Company, Limited, Asfordbury, at £1,083, for the supply of main pipes and connections required at the several gasworks during a period of three months.

Sheffield T.C.—The city council have agreed to construct a tank for supplying water to Stockbridge Garden Village, at an estimated cost of £1,030.

Tanderagee R.D.C.—The council have appointed Mr. C. E. Larmour Banbridge engineer in connection with the water supply.

Walsall T.C.—It was reported that the gross profit on the gas undertaking last year was £15,765 against £16,816 in 1917, and £19,694 in 1916. The electricity undertaking it was stated had made a gross profit of £13,949, but payments for interest and sinking fund not only wiped out this amount, but left a deficit of £3,998, which, with a deficit of £8,988 brought forward from last year, made a total loss of £12,986, towards which £4,000 had so far been paid out of the rates. With regard to the balance of £8,986, a claim was to be made against the Ministry of Munitions. It was also mentioned that, in view of the increase in the cost of coal, it had been decided to increase the price of electricity by 10 per cent, and it was stated that the Gas Committee had a similar step under consideration.

Wigan T.C.—The town council have accepted the tender of Messrs. Massey Bros., at £8,030, for the extension of the buildings at the electricity station.

MISCELLANEOUS.

Knaresborough R.D.C.—After considering representations from contractors the council agreed to advance the price for team labour from 9s. to 10s. per day.

Paul U.D.C.—The Admiralty wrote regretting that they were unable to release Mr. W. F. Trembath, the council's surveyor (who was summoned to the Colours as an R.N.R. man at the outbreak of war), in order that he might return to his duties. The application was made by the council as the deputy-surveyor had resigned.

Prudhoe U.D.C.—The council have decided to establish a municipal piggery.

Tyrone C.C.—The Local Government Board have approved of the council's proposal to increase the assistant surveyors' salaries to £140 per annum. A direct labour scheme for Cookstown rural district and a supplemental scheme for Dungannon rural district have been adopted by the council.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. The letter X, combinations such as X.Y.Z., and words such as "engineer" and "surveyor," should never be used.

"Erection"—Wooden Fence.—"Velox" writes: Can a wooden fence (dividing two estates) composed of 11 in. by 3 in. timbers with ends let into the ground and a ½-in. space left between each plank be considered as an "erection" legally; and if eventually the ½-in. spaces are filled in would that alter the case?

There is no statutory definition of an "erection," but the question whether a fence is an "erection" appears to depend partly upon its height, and partly upon the purpose for which it is used. A wall 11 ft. high, used as a screen to exhibit advertisements, and also as a boundary to a forecourt, was held to be a "building, structure, or erection" within the meaning of sec. 75 of the Metropolis Management Act, 1862, which prohibits the erection of a "building, structure, or erection" beyond the general line of buildings, without the consent of the London County Council (*Lavy* v. *London County Council*, 59 J.P., 630). And the erection of hoardings for advertisements was held to be a breach of a covenant not to erect or make any "building or erection" on certain land (*Pocock* v. *Gilham*, 1 C. and E., 104). Assuming that the fence is intended to be used and is used solely as a boundary between the two estates, I do not think it would be held to be an "erection," whether the ½-in. spaces are filled in or not.

PERSONAL.

Mr. H. C. Marks, city surveyor of Carlisle, has been appointed local fuel overseer.

Mr. C. T. Fulcher, acting borough surveyor of Shoreditch, has had his salary increased by £100 a year.

Mr. J. N. Jefferies, surveyor to the Chepstow Urban District Council, has been granted a war bonus of £50 per annum.

Mr. Reg. Booker, surveyor to the Littlehampton Urban District Council, has had his salary increased by £25 a year.

Mr. W. R. Humphrey, Leyton, has been appointed borough surveyor and collector of Wilton, in succession to Mr. W. J. Hiscox, resigned.

Mr. Evan Roberts, sanitary inspector for the borough of Carnarvon, has been elected a Fellow of the Sanitary Inspectors' Association.

Mr. W. H. Eley, surveyor to the Newmarket Urban District Council, has had his salary increased to £340 a year, subject to the consent of the Local Government Board.

Second-Lieutenant J. R. Sydenham, son of Mr. Sydenham, building inspector to the Barry District Council, has been wounded in the leg in France, and sent back to hospital at Corsham. He had only returned to France three weeks ago.

Mr. E. S. Pinkerton has been appointed assistant city surveyor under a new staff scheme approved by the Belfast City Council, Mr. H. F. Gullan, assistant city engineer, and Mr. Samuel Mahood, senior superintendent of the street and house cleansing department.

Mr. F. J. Slater, borough engineer of Camberwell, has been nominated with two borough councillors to attend the housing and arterial roads conference convened by the London County Council at the County Hall, Spring Gardens, on Wednesday, October 30th, at 11 a.m.

Mr. Richard Humphreys, surveyor to the Ruthin Rural District Council, who joined the army about eighteen months ago, has been wounded in France, and is now at Birkenhead Hospital. The clerk has been directed to write to him conveying the council's sympathy.

Mr. A. Warren, borough surveyor and sanitary inspector of Totnes, is recommended by the Bridges and Main Roads Committee of the Devon County Council for appointment as one of the divisional county surveyors, the duties in connection with which he has been discharging for some time past.

Mr. J. Hodgson, highway surveyor to the Croft Rural District Council, has been presented with a gold watch subscribed by the members and officials on completing fifty years' service. Part of Mr. Croft's service was under the defunct Highway Board, with which he was connected for twenty-seven years.

Captain E. R. Matthews, R.A.M.C., Commanding Officer of one of the sanitary sections overseas, has been appointed a Specialist Sanitary Officer (S.S.O.). Captain Matthews has been overseas three years in command of sanitary sections, and in civil life will be remembered as being borough engineer of Bridlington, and later, Chadwick Professor of Municipal Engineering in the University of London, which position he still holds.

Sanitary Inspectors and Trade Unionism.—The Sanitary Inspectors' Association has decided by five votes in a poll of 640 against the proposal to convert it into a trade union.

Marketable Value of Sludge.—At a meeting recently of the West Kent Main Sewerage Board a resolution was adopted authorising a special committee to expend a sum not exceeding 200 guineas upon investigations with a view to ascertaining the practicability of utilising the product derived from the treatment of sewage at the board's disposal works.

Certified Occupations: New List.—A new list of certified occupations has been issued, and comes into force on Thursday next. A new method has been adopted for indicating what men are covered by its provisions by stating the year of birth. Any man born in or before the year specified for his occupation and grade comes within the list. The former distinction between single and married men has been discontinued, and a shorter period of qualification has been fixed. Numerous alterations have been made as to the occupations which are certified, and the ages to be attained to qualify for inclusion. The list is obtainable through any bookseller at the price of 1d.

FOR OTHER ADVERTISEMENTS
See End of Paper.

YOUTH, aged 16½, with two years' experience as pupil, requires position as Improver or Junior Assistant to a Surveyor.—Write, stating salary offered, to Fearle, Ivy Cottage, Coates, near Whittlesea. [3,873]

INSTITUTION OF MUNICIPAL ENGINEERS.

COUNCIL MEETING.

At a meeting of the council of the Institution of Municipal Engineers held in London on September 5th the following applicants were recommended for admission to membership, namely: Messrs. W. J. Elliott, assistant county surveyor, Armagh; Thos. H. Leech, assistant county surveyor, Meath; W. J. O'Donnel, assistant county surveyor, Kerry; Michael Morrissy, town surveyor, Kilrush Urban District Council; J. J. Shortall, town surveyor, New Ross; Edward Daly, town surveyor, Bundoran Urban District Council; T. J. O'Neill, town surveyor, Ballyclare Urban District Council; T. J. Walsh, borough surveyor, Connel; R. S. Barnes, borough surveyor, Navan Urban District Council; Oswald G. Tough, engineer and surveyor, Tralee Urban District Council; Patrick J. Brady, engineer and surveyor, Ballinamore, Cootehill, Belturbet, Bawnboy and Bailieborough District Councils; Denis J. Buckley, surveyor, Fermoy and Mallow Urban District Councils; J. F. Gavagan, engineer, Ballymore, Athlone and Ballymahon Rural District Councils; J. Mooney, engineer, Glin Rural District Council; W. Leo Lewis, district surveyor, Smallborough Rural District Council; T. Clayton, County Surveyor's Office, Berks County Council; E. Pollard, water, &c., engineer, Leighton Buzzard Urban District Council, and J. B. Fairchild, surveyor and engineer, Potterspury and Stratford and Wolverton Rural District Councils.

Sixteen applicants for membership whose names had been duly published were admitted.

Mr. H. Cuffley Ridge, Surveyor's Office, Romford Urban District Council, was elected to studentship.

CONTROL OF HIGHWAYS.

Following upon the resolution which was carried at the last meeting, copies of which were sent to the departments concerned, it was decided to approach the Road Transport Board with a view to obtaining full representation on Divisional Road Transport Boards and Area Transport Committees. As matters are at present, county interests only are represented, and it is felt that borough, urban and rural districts should have equal representation, having regard to the mileage of the highways which they control.

MUTUAL AID AND DEFENCE FUND.

An application was made under this Fund by a member, and it was decided to call a meeting of the Board of Professional Defence to deal with it.

REMISSION OF SUBSCRIPTIONS.

Applications were made by certain members who had been discharged from active service, and it was decided that the whole of the subscriptions payable by these members while on such service be remitted.

ANNUAL MEETING PROGRAMME.

The tenth annual general meeting of the Institution of Municipal Engineers will be held at Southall, Middlesex, on Wednesday and Thursday, October 9th and 10th.

PROGRAMME.

Wednesday, October 9th.

10.30 a.m.—Adjourned council meeting at Town Hall.
11.0 a.m.—Assemble at Town Hall.
11.15 a.m.—Reception by the chairman of the Southall-Norwood Urban District Council (Mr. W. Cantwell, J.P.).
11.30 a.m.—Annual general meeting.
Minutes of last meeting.
Presentation of annual report of council.
Announcement of ballot for council for year 1918-19.
Installation of president.
Any other business.
Presidental address.
The secretary will present a contribution descriptive of the activities and growth of the institution during the decade 1908-1918.
1.0 p.m.—Adjourn for luncheon (price 3s. 6d.).
2.0 p.m.—Proceed on visits as follows:—
Messrs. Lowden's Lamp Works. View complete manufacture of electric incandescent lamps.
3.0 p.m.—Trade waste purification works and tin salvage at Messrs. Tickler's factory.
3.45 p.m.—Victor Tyre Works. Inspect reinforced concrete building and view shell making.
4.15 p.m.—Arsenal new building. Inspect reinforced concrete structure in progress, together with examples of "Belfast" roof trusses of from 50-ft. to 100-ft. span, built up of short lengths of timber.
5.0 p.m.—Open air swimming baths.
5.30 p.m.—Council's dock.
6.15 p.m.—Tea in the Manor House grounds, at invitation of the president.
8.0 p.m. Invitation smoking concert.

Thursday, October 10th.

10.0 a.m.—Meet at Hanwell Broadway (Tram Depot.).
10.15 a.m.—Proceed to the Southall-Norwood Sewage Disposal works (chemical precipitation combined with bacteriological treatment) and laboratory.
11.15 a.m.—Mr. J. H. Edmondson, F.C.S., chemist and manager of the works, will present a paper "The Management of Small Sewage Disposal Works." Discussion.
12.0 noon.—Visit the sewage disposal works of the Hanwell Urban District Council.
1.0 p.m.—Luncheon at the Park Hotel, Hanwell (price 3s. 6d.).
2.30 p.m.—Proceed to Southall by train (1½d.).
2.45 p.m.—Visit Maypole Margarine Works and inspect the whole of the processes of manufacture.
5.0 p.m.—Tea at the Maypole Works by kind invitation of the managing director of the company.

Southall is situated 9 miles from Paddington Station, Great Western Railway. It may also be reached from any District Railway Station to Ealing Common Station, and thence by tram to the Southall Town Hall.

CORRESPONDENCE.

(One man does not see everything.)
—EURIPIDES.

"CAN SMALL HOUSE CONSTRUCTION BE CHEAPENED?"

To the Editor of THE SURVEYOR.

SIR,—I am sorry I did not previously see the above report which was in your issue of June 7th.

Mr. Macartney's paper was one of the most thoughtful and practical that I have yet seen on the housing question. He must have put a considerable amount of thought and infinite labour in compiling the facts he gave.

New methods must be employed to enable us to economise and also to prevent a great housing famine.

The walls of the cottages in the future will be thinner, but warmer, because they will be built of porous materials which will absorb the heat generated in the house, and although thin they will be made weatherproof by waterproofed cement renderings. The roofs will often be made of concrete on account of the high cost of wood. Especially will bay-window and porch roofs be made of waterproofed concrete. It is not generally known that 3¾ in. of good cement concrete can be safely laid to a width of 4 ft. without reinforcement, thus saving not only the timber in the roof, but the slates or tiles, flashings, ridges and much waste of material in cutting the angles.

In the discussion which followed the reading of the paper, two speakers asked for information with regard to the building of houses with thin walls. They will be interested to know that many hundreds of houses have been built by the British Government with 2⅝-in. coke breeze slab walls between 9-in. piers and then rendered with ¾ in. of Pudloed cement.

I shall be glad to send to any reader a list of Scottish dwelling houses and more important buildings, the walls of which have been cement-waterproofed, thus dispensing with the usual internal strapping or plaster stoothing which is so common in Scotland. In no case have the fierce Scottish rains penetrated the waterproofed cement rendering. I have also compiled a booklet (No. 15) treating solely of waterproofed cement as applied to cottages (free on demand).—Yours, &c.,

J. H. KERNER-GREENWOOD.

King's Lynn.
September 12, 1918.

Coal Overseerships. — Correspondence with regard to these posts is proceeding between the Institution of Municipal Engineers and the Coal Controller, and certain cases of questionable and irregular appointments are now being brought to that official's notice.

New Trunk Road System for Natal.—The growing demands of inland traffic and the increasing use of motor vehicles for commercial and agricultural purposes have suggested to the Government of Natal the expediency of road development upon an extensive scale. The engineer superintendent of roads has prepared a scheme for the expenditure of £1,404,000 upon a main trunk road system, the work in connection with which will take many years to complete. The proposal is to spend on the trunk and divisional roads—these latter being also projected—£226,000 annually, a sum representing £85,000 per annum more than the money expended during the past two years on the roads under the existing system. The scheme involves the abandonment of 592 miles of roads, and the construction of 122 miles of new roads. The total mileage of the Natal roads is 592 miles.

CONDEMNED PROPERTY.

CORPORATION SUES FOR COST OF DEMOLISHING.

The Corporation of Carnarvon, through their town clerk (Mr. R. O. Roberts), sued Mrs. W. Lloyd Roberts, at the local magistrates' court on Monday, for the recovery of £23 as expenses incurred in demolishing condemned property known as "Shaddock Court." Mr. Richard Roberts, for the defence, complained to the bench of the ridiculously small prices realised by the corporation for the materials sold, only £3 being received for 6,000 old bricks. It was, however, pointed out that the sale was by public auction, which had been duly advertised. An order for payment was made, subject to the accounts being verified by the magistrates' clerk.

A similar summons (the *Liverpool Daily Post* reports) was issued in respect of another property owned by four persons, one of whom was said to be in receipt of parish relief. The amount claimed was £26. In this case Mr. Richard Roberts maintained that as the property was uninhabited and out of sight it was neither an eyesore nor dangerous, and he charged the corporation with using its powers arbitrarily in pulling it down.

An adjournment was allowed for the presentation of further accounts and to enable the parties to settle.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

FIRE BRIGADE SUPERINTENDENT.—September 23rd.—Long Eaton Urban District Council.—Mr. F. Worrall, engineer and surveyor, Electricity Works, Long Eaton, Derbyshire.

TECHNICAL ASSISTANT. — September 23rd. — Newport (Mon.) Electricity and Tramway Department. £250 a year.—Mr. A. N. Moore, borough electrical and tramway engineer, Town Hall, Newport, Mon.

TRAMWAYS MANAGER. — September 24th. — Bradford Town Council. £800 a year.—Mr. F. Stevens, town clerk, Town Hall, Bradford.

SURVEYOR'S TEMPORARY ASSISTANT.—September 25th.—Axbridge Rural District Council. £2 10s. per week.—Mr. J. Lovell, district surveyor, Surveyor's Office, Cheddar, Somerset.

BOROUGH SURVEYOR AND SANITARY INSPECTOR.—September 27th.—Totnes Town Council. £160-£200.—Mr. Edward Windeatt, deputy town clerk, Town Clerk's Office. Totnes.

SURVEYOR'S TEMPORARY ASSISTANT. — September 28th.—Finchley Urban District Council.—Mr. E. H. Lister, clerk, Council Offices, Church End, Finchley, N. 5.

TEMPORARY ENGINEERING ASSISTANTS AND DRAUGHTSMEN.—Westminster City Council. £5 5s. and £4 9s. per week.—Mr. J. W. Dugdale-Bradley, city engineer.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

BELFAST.—September 24th.—For the erection of a laboratory at the infectious diseases hospital.—City Surveyor, Town Hall, Belfast.

GREETLAND.—September 28th.—For the erection of a communal kitchen.—Mr. Arthur T. Longbotham, clerk to the urban district council, 4 Carlton-street, Halifax.

Roads.

ROMFORD.—September 23rd.—For the supply of 650 tons of blue Guernsey granite.—The Acting Surveyor, Urban Council Offices, Market-place, Romford.

HOLLINGBOURN.—September 26th.—For the supply on hire of steam rollers.—Mr. H. J. Bracher, clerk, Rural District Council, 33 Earl-street, Maidstone.

WESTHAMPNETT.—For steam rolling the roads.—Mr. W. D. Rasell, clerk, Rural Council Offices, 5 South-street, Chichester.

Sanitary.

COULSDON.—September 25th.—For laying 500 yds. of 9-in. piper sewer with manholes.—Mr. A. Clark, acting surveyor, Urban Council Offices, Purley, Surrey.

WALSINGHAM. — For the supply of disinfectants.—W. O. Humphrey, Norwich-street, Fakenham, Norfolk.

Miscellaneous.

DUNDEE.—September 28th.—For the supply of 1,200 ft. of best hand-made flax canvas fire hose.—Mr. J. S. Weir, fire master, West Bell-street, Dundee.

TENDERS FOR MUNICIPAL WORK OR SUPPLIES.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the informaton given under this head as complete and accurate as possible.*

EASTBOURNE.—For additions to the administrative building at the Gildridge Hospital, for the Sanitary Committee.—The Building Surveyor, Town Hall, Eastbourne:—

J. W. Woolnough, Eastbourne	£556
Peerless, Dennis & Co., Eastbourne	523
A. W. King, Eastbourne	419
G. Bambridge & Son, Eastbourne*	362
Miller & Selmes, Eastbourne	330

* Accepted. Architect's estimate, £350.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

SEPTEMBER.

20-21.—Institution of Municipal and County Engineers: Meeting at Middlesbrough.

27-28.—Institution of Municipal and County Engineers: Meeting at Penarth and Barry.

OCTOBER.

9-10.—Institution of Municipal Engineers: Annual meeting at Southall, Middlesex.

EXAMINATIONS.

THE SURVEYORS' INSTITUTION.

(Incorporated by Royal Charter),

12 GREAT GEORGE STREET, WESTMINSTER, S.W. 1.

EXAMINATIONS, 1919.

PRELIMINARY EXAMINATION.

Notice is given that the Preliminary Examination for the admission of Students will be held on the 15th and 16th of January next.

Candidates from the counties of Lancashire, Cheshire, Yorkshire, Durham, Cumberland, Westmorland, Northumberland, Staffordshire, and North Wales will be examined at Manchester. Candidates from other counties in England and Wales will be examined in London.

Irish Candidates will be examined in Dublin.

Scottish Candidates in Glasgow.

PROFESSIONAL EXAMINATIONS.

Notice is also given that the Annual Professional Examinations for Land Agents, Valuers, Building, Quantity and Mining Surveyors (held under the provisions of the Charter), will be held on the 24th to 28th of March next inclusive.

All English Candidates for the Professional Examinations are examined in London.

Irish Candidates in Dublin.

Scottish Candidates in Glasgow.

All applications for both the Preliminary and the Professional Examinations must be sent in before the end of September. The necessary Entry Forms for the various Examinations, and particulars as to subjects, course of examination, and prizes can be obtained of the Secretary.

(3,869)

APPOINTMENTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

AXBRIDGE RURAL DISTRICT COUNCIL.

Wanted, temporary Assistant in Highway Surveyor's Office (ineligible for Military Service). Salary, £2 10s. per week, to include the provision of a bicycle.

Applications, stating age, experience, present occupation, and accompanied by copies of three recent testimonials, must reach the undersigned not later than September 25th, 1918.

JNO. LOVELL,
District Surveyor.

Surveyor's Office,
Cheddar, Somerset.
September 11, 1918.

(3,870)

The Surveyor

And Municipal and County Engineer.

Vol. LIV. SEPTEMBER 27, 1918. No. 1,393.

Minutes of Proceedings.

Dangerous Places near Highways (II.).

The duties of property owners stand upon a somewhat different basis from those of highway authorities. In addition to their statutory obligations (to which we shall refer) it is a well-established principle of common law that where land adjoining a highway is, by reason of excavation or otherwise, in such a state as to be a source of danger to the public, it is the duty of the owner to fence it. With this important exception, however, there is no *general* obligation on the part of the owner of land adjoining a highway to fence his land. But if he does fence it he is bound to keep his fence in proper repair, and if he allows it to get into such a state as to be dangerous to passengers, he will be liable should an accident occur. (*Harrold* v. *Watney* [46 W.R., 642].) That case is a very striking illustration of this principle, because the plaintiff (who was a small boy) was injured in consequence of his clambering up the defendant's ruinous fence, with the intention of trespassing on his land. Turning now to the *statutory* obligations of property owners, under sec. 70 of the Highway Act, 1835, it is illegal to sink a pit or shaft, or to erect a steam engine, &c., within 25 yds., or a windmill within 50 yds. from a carriageway or cartway, or to make a fire for burning ironstone, limestone, bricks or clay, &c., within 15 yds. from a carriageway or cartway, except (in each instance) within a building, or behind a wall or fence sufficient to *conceal* or *screen* the danger. It has been held, however, that this section does not impose an obligation to construct a fence strong enough to withstand the shock of a heavy vehicle (*Blakely* v. *Baker and Another*; 39 L.T. (N.S.), 539). Reference has already been made to the duty of quarry owners under the Quarry Fencing Act, 1887. Provisions with respect to the fencing of abandoned mines are contained in the Metalliferous Mines Regulation Act, 1872, and the Coal Mines Act, 1911. By the combined operation of these Acts, the owner of an abandoned mine is bound to fence the top and entrance of every shaft or outlet thereof; and an unfenced shaft or outlet of any abandoned coal, ironstone, shale or fireclay mine, wherever situate, and an unfenced shaft or outlet of any other abandoned mine which is within 50 yds. of a highway or footpath, *or* on unenclosed land, is a nuisance within the meaning of Sec. 91 of the Public Health Act, 1875. Whether, in the event of there being no owner or occupier of the mine, the authority ought themselves to fence it (as in the case of a quarry) does not appear to have been decided. In districts in which Sec. 30 of the Public Health Acts Amendment Act, 1907, is in force the owner of any building, wall, fence, steps, structure, or other thing, or any well, excavation, pond, stream, dam or bank in any situation fronting or abutting on any street or public footpath, which is, for want of sufficient repair, protection or enclosure, dangerous to passengers, can be compelled to repair, remove, protect or enclose it, or to pay the expense incurred by the district council in so doing; and in districts in which Sec. 31 of the Act is in force the owner of land adjoining a street which, though being unfenced or with fences out of repair, is a source of danger to passengers can be compelled to fence it, or repair the fences, or to pay the cost of the necessary work if done by the district council. These various enactments provide speedy and effective methods of enforcing the duties of property owners in particular cases. Where they are inapplicable, the tardier and more cumbrous remedy of an indictment, or an action in the name of the Attorney-General, would presumably have to be resorted to.

* * * *

Public Health in Scotland.

In the selection of subjects for discussion at its recent annual congress at Stirling, the Incorporated Sanitary Association of Scotland showed that it was not afraid to tackle large questions of policy. In present circumstances it was only natural that the question of the establishment of a Ministry of Health should have occupied a prominent place in the programme of proceedings. Two excellent papers on this subject were read by Dr. Munro, the county medical officer of Renfrewshire, and Mr. Marshall, the clerk to the Lanarkshire Insurance Committee, respectively. While we are in no way opposed to the scheme for the establishment of a Ministry of Health, we are glad to observe that Dr. Munro had a good word to say for the administration of the past. While there is no doubt plenty of room for improvement, we entirely agree that "there has been no such failure in public health administration as the crusade for a Ministry of Health suggests." Public Health administration has not been a failure, but it has been inadequate and badly organised, and it is in regard to the latter point perhaps that the best case for the proposed ministry can be made out. Mr. Marshall made an earnest appeal for improved methods in public health work and very pertinently pointed out that deaths on the battlefield during the last four years have not exceeded in number the preventable deaths among our infants at home. Another paper which raised a large issue was that in which Mr. Lambie advocated the substitution of income tax on a national basis for the present system of local rating. The latter is manifestly far from being equitable, but we imagine that there are few reformers who would be prepared to go so far as Mr. Lambie. Last, but not least, we must refer to the presidential address of Mr. Frew, the county sanitary inspector of Linlithgowshire. This was almost entirely devoted to impressing on his audience the importance of individual responsibility in matters of sanitation. Until the public have learnt the lesson which Mr. Frew sought to enforce, those concerned with the preventive side of public health work will always be conscious of the heavy handicap of ignorance.

* * * *

English Public Health Administration.

Faulty generalisation and a disposition prone to questions, self-criticism and depreciation of national effort and institutions are responsible for a great deal of misapprehension abroad of the quality of our administrative services. The enemy, of course, gloats and exults over these too sweepingly candid tirades of ours, and is generally at fault owing to ignorance of the peculiar British psychology—the result of our free institutions and a weakness for underestimating the functions of organised authority—which persists in grumbling as a primary and permanent privilege. This being so, it is satisfactory to read Mr. A. Shadwell's letter in the *Times*, in which he replies to the statement of the Prime Minister that as regards the organisation of the forces which have special charge of the health of the nation, we have done less than any other first-class country in the world. Speaking from intimate and systematic investigation, both at home and abroad, Mr. Shadwell asserts that as regard public health administration, the standard in England is "immeasurably above that of other countries, and very far above most of them." England, he declares, is the great pioneer in public health and sanitation, and although he cannot say the same of Scotland as a whole, nor of Ireland at all, he is prepared to maintain his contention against any one. This is no reason why we should not strive to make things still better, but it is well to have such a claim placed on record by one who knows what he is writing about.

* * * *

Comparitive Road Costs.

An important investigation was undertaken not long ago by the New York State Highway Department for the purpose of comparing the "ultimate cost" of water-bound and bituminous macadam. This "ultimate cost" includes factors representing not only the original cost of construction, but also subsequent expenditure on maintenance, repairs and resurfacing.

In other words, the "ultimate cost" is the average annual amount expended in constructing, repairing, resurfacing, and when necessary reconstructing a square yard of road. Its determination depends on a number of varying factors, such as first cost, ultimate life, loan interest, annual cost of maintenance and repair, cost of resurfacing, and length of the intervals at which resurfacing is carried out. Without going into details, it may be stated that the result of the investigations shows very little difference indeed between the ultimate cost, as above defined, of water-bound macadam, bituminous macadam, and water-bound macadam that has been resurfaced with bituminous material. This result was obtained because, while the first cost of bituminous macadam was higher, this was apparently almost balanced by relatively lower maintenance charges. Moreover, although there is not much difference in the figures of ultimate costs, when it is remembered that the traffic on the water-bound roads was almost certainly considerably less than that on the bituminous paving, the ultimate cost of the latter really compares very favourably with that of the former.

AN INTRODUCTION TO THE PHILOSOPHY OF SEWAGE IRRIGATION.

By James Craig,
Sewage Works Manager, Romford, Essex.*

The application to land of liquid sewage in a sufficiently mobile condition to gravitate is commonly known as sewage irrigation, and from the time of the introduction of sewers for conveying the sewage away from populated areas down to almost the close of the last century irrigation of land was the system of disposal chiefly in vogue. But as our cities and towns cannot all comply with the idea of the worthy countryman who, after his first visit to London, being asked what he thought of it, replied "That it was a fine place if it was out in the country," it is obvious that other considerations attract these congregations of the people, and the question of whether suitable land can be obtained for sewage irrigation comes as an afterthought and often debars the acquisition of sufficient or suitable land for sewage irrigation.

It is regrettable that many of the old sewage irrigation farms caused serious disappointment, and the regret has been emphasised greatly since the country has been at war and fertilisers have become almost unobtainable. The matter is further aggravated by the fact that in many cases the old sewage farm was looked at through financial spectacles rather than from a sanitary point of view, and the gulf was so great between the status of the man in charge and other officials with probably not more responsibility that failure was the natural corollary.

CHOICE OF SITE.

In choosing a site for sewage irrigation the nature of the surface and subsoil is of great importance. An ideal formation would be a gravelly loam overlaying a coarse, gravelly subsoil; indeed, unless a sufficient area with means for extension of something approaching this type of land can be secured within reasonable distance of and altitude to the town and stream, other methods should be considered. Any land having impervious strata or clay formations within 3 ft. 6 in. of the surface should be completely avoided for irrigation purposes.

As regards the contour, the nearer the site can resemble a slightly inclined plane the better; but while an undulating surface is more costly to lay out and requires greater cost and skill to irrigate, the general principle of avoiding the path of least resistance in actually applying the sewage to the land holds good on most treatment areas.

The sewage should be delivered at a point of the irrigation area from which it can diverge by gravitation to the whole area and prospective extension areas. It will be found most convenient to have the system of distribution arranged so that the rate of flow per acre can be varied, enabling large or small sections of the area to be irrigated or rested as desired.

The conveying channels may be made of a variety of materials such as wooden or metal troughs, concrete channels, earthen channels, stoneware pipes, concrete tubes, cast-iron pipes, &c. These may be laid above or below ground but the author considers that glazed stoneware pipes or concrete tubes thoroughly jointed and sufficiently underground to be protected from climatic influences answers the purpose admirably. Of course others carriers than main arteries may be advantageously formed in the soil itself unless a valley has to be crossed, when pipes laid on the syphonage principle would have to be resorted to in preference to carrying the liquor overhead in open or closed channels.

DISTRIBUTION.

The distribution of the sewage on to the land requires careful attention. With arable land the ordinary ridge and furrow method of distribution gives very good results as long as the sewage is allowed a fair velocity for 4 ft. or 5 ft. after entering the furrow. Then the velocity should be checked by means of small stanks made from the soil at distances apart to suit the gradient of the section being irrigated. These baffles can be made by spade or shovel, or an arrangement can be fixed on the ordinary horse hoe to do the work more expeditiously. Five-feet baulks are also suitable for arable land. Grass land and other broadcast-sown crops may be laid out with slight furrows further apart, but at distances and altitudes to ensure quick and thorough saturation of the surface. In most grades of irrigation land it will be found beneficial to the production and maintenance of a good effluent to have the underground drains laid parallel in preference to what is known as the "herring-bone" or lateral principle, and in the application of the sewage to the surface it should be conveyed, so far as is practicable, in a direction parallel to the underground system of drainage. Crossing over the line of an underground drain with furrows conveying sewage should be avoided, as this often causes percolation of polluted water directly to the drains and the polluting of an otherwise good effluent. Distribution is greatly aided by regular loosening of the surface of the ground; if it is allowed to form a crust, absorption is retarded, the sewage takes the path of least resistance and ponds in the lower places with often disastrous results as well as aërial and aqueous pollution.

DRAINS.

For the purpose of laying underground drains for drawing off effluent the author is of opinion that these should be of an average depth of 4 ft. 6 in. with a gradient of at least 1 in 1,000, and glazed socketed stoneware pipe drains laid parallel to each other and discharging into an intercepting drain which should be cement jointed with an effluent inspection chamber for each independent section of the land. The individual pipes of the collecting drains should be laid so that the spigot end only enters about half way into the socket—not forced tight up, as is done by many drainers with the back of the spade.

The trenches should be excavated sufficiently wide at the bottom to admit of 4 in. to 5 in. width of screened gravel or other clean, hard media being placed along each side of the pipes and over the top of the pipes to a depth of 12 in., then placing newly-cut turf inverted over the gravel or a thin layer of straw or fine brushwood to arrest the fine particles before getting to the pipes. The trenches require to be carefully filled and rammed. In running sand it would be found advisable to supplement this by placing a layer of fine brushwood in the trench before laying the pipes to prevent the fine particles getting into the pipes from underneath and filling them up.

The sewage should be subjected to sedimentation in tanks prior to being irrigated and the sludge removed from the tanks into storage lagoons until such time as the land is void of crops, when it can be carted, spread, and ploughed under preparatory to planting subsequent crops.

In conclusion it is only fair to say that an irrigation scheme with a sufficiency of good land carefully chosen, laid out and carefully managed, will give results which will compare favourably with most other schemes in operation at the present time, and it has the casting balance of not adding materially to the waste of mineralised manurial constituents that are daily making their way from other systems to the ocean instead of producing useful vegetation and maintaining the cycle of change through which matter passes from living tissue to inorganic substances and thence to living tissue again.

* Paper read at a meeting of the Association of Managers of Sewage Disposal Works, held at Romford.

The Equivalents of the Fuel and Lighting Order. — Commenting upon the Household Fuel and Lighting Order, the latest issue of the *Illuminating Engineer* says: "There has been some discussion on the relative amounts of gas and electricity specified in the lighting allowance, but we have reason to believe that this matter was most carefully gone into by the authorities, who have made special efforts to provide an impartial and just solution. Some gas engineers have urged that the allowance for electricity is unduly liberal. Some electrical engineers, on the assumptions that 1 cub. ft. of gas (low-pressure incandescent mantles) yields 20 c.p.-hours, and that 1 unit of electricity (ordinary tungsten lamps) yields about 1,000 c.p.-hours, find that, on the basis of light for light, the comparison is not particularly advantageous to users of electricity. The Order regards 750 cub. ft. of gas, giving on the above basis 15,000 c.p.-hours, as equivalent to 12 units of electricity, giving only 12.000 c.p.-hours. Assuming, therefore, that the object of the allowance is to provide the same amount of light in each case, the consumer who uses gas lighting would, on this basis, be at an advantage. It is argued that to demand a diminution in the electricity ration is to underestimate the efficiency of the average gas lighting. We have dwelt upon this point because it seems to us that the principle on which the allowances for lighting are related should be the provision of equal illumination."

Sewage Disposal at Warwick.

NEW WORKS PROVIDING FOR POPULATION OF 12,000.

Designed and carried out by Messrs. Dodd & Dodd, MM.INST.C.E., County-chambers, Corporation-street, Birmingham, new works for the disposal of the sewage of Warwick were put into operation in July, 1916. The population of Warwick is about 12,000, with a dry-weather sewage flow of 450,000 gallons, and the whole of the town's sewage gravitates to the new works, which are situated at Longbridge, off the Stratford road, this being the site of the original works. The works recently installed are capable of dealing with three times the dry-weather flow, as sewage proper, while a further three dilutions passes to the storm-water tanks. The capacity of the works has been designed in striet conformity in all respects with the requirements of the Local Government Board.

WARWICK SEWAGE DISPOSAL WORKS: PLAN.
(Messrs. Dodd & Dodd, Birmingham, Engineers.)

SCREENS AND DETRITUS CHAMBERS.

The sewage on reaching the works is first passed through the screening and detritus chambers. The screens and elevators are Messrs. S. S. Stott & Company's, being their latest type of self-cleansing pattern. They are in duplicate,

and can be worked singly or in combination. The whole apparatus is driven by an 8-b.h.p. electric motor, situated in the building over the screens. In each chamber fixed weirs control the volume of sewage to the sedimentation tanks, as well as that diverted to the storm-water tanks. After applying the current, the whole apparatus becomes automatic; the only labour required is for the purpose of removing the deposited detritus and rakings.

SEDIMENTATION TANKS.

These tanks are in duplicate, each being 64 ft. diameter, having a combined capacity of 500,000 gallons. The tanks

Storm-Water Tanks, Sedimentation Tanks and Screening and Detritus Chambers, Warwick Sewage Disposal Works.

are operated separately and worked alternately for the purpose of sludging. The top water is drawn off by floating arms, and gravitates to the pump well, from which it is raised to the sewage farm for irrigation purposes. The sludge accumulating in the tanks gravitates to the sludge well, from which it is pumped on to the sludge-drying area.

STORM-WATER TANKS.

These tanks also are in duplicate, having a total capacity equal to half the dry-weather flow. The clarified tank effluent passes over a fixed weir to the river. Again, only one of these tanks is employed for dealing with the storm water, one tank being of ample capacity for receiving any volume of storm water likely to be discharged during a storm. The object of having two tanks is to provide for the recurrence of storms and also for sludging purposes. Upon clarification of the storm water in the tank, it is drawn off by means of floating arms to the river. The deposited solids

Sedimentation Tanks and Screening and Detritus Chambers (Unfinished).

from the storm tanks are dealt with in the same way as the sludge from the sedimentation tanks.

SLUDGE-DRYING AREA.

Two acres of land have been specially prepared for dealing with the sludge. The area has been divided up into convenient beds and under-drained. The drainage from these beds gravitates to the sewage pump well and is ultimately pumped up with the sewage to the farm. The sludge remaining in the trenches after air-drying is removed to a convenient tip, or dealt with in such manner as may be determined.

DESCRIPTION OF PUMPING MACHINERY.

The sewage-pumping plant installed to deliver the sewage from the outfall works to the sewage farm consists of two 6-in. "Stereophagus" centrifugal pumps, made by the Pulsometer Engineering Company, Limited. The pumps have each a capacity of 950 gallons per minute when discharging against a total head, including friction, of 68 ft. and running at about 1,120 revolutions per minute, and are each coupled to and driven by a 45-b.h.p. shunt-wound motor built by the General Electric Company, working on 425-460 volts, direct current. A flexible coupling is provided on each set, which is mounted on an extended bed and thus forms a compact, self-contained unit, having a weight of about 2½ tons. The power absorbed by the pumps when working on supernatant water is naturally very much less than that given out by the motors, but, as the head varies between considerable limits, the consulting engineers decided to provide a margin of power sufficient to provide for this and to overcome all resistance when cutting up such solids as pieces of brick, wood, &c., which might at times find their way into the sewage well without putting any overload whatever upon the motors.

This provision proved extremely useful while the main contractors were completing their connections to the works, when for a period of nearly one month pumping was continued night and day by means of one of the "Stereophagus" pumps.

A common suction pipe leads from the outside well into the pump room with easy branches into each pump with isolating valves. On the discharge side the pumps deliver

Sludge Drying Beds.

through 6-in. pipes, with control valves of the full-way sluice type, and run into a rising main through a gradually increasing taper pipe.

Each pump is fitted with sight glasses to indicate level of sewage at starting, and with a tachometer to show speed of rotation.

Between the two sewage pumps there is mounted on a pillar an emergency tumbler switch to cut out the motor running in case of necessity.

The pumps are automatically operated by means of a float switch in the sewage well in circuit with two Ingranic multiple Clapper type starting rheostats, mounted on the top of the switch-board. By this means one or the other of the sets can be started up automatically by the rise of the sewage in the well alongside the pump room, and when the sewage has fallen to a predetermined level the float switch cuts out the motor and thus stops the pumping. Very little personal attention is therefore required.

To enable automatic control to be obtained and to avoid the use of foot valves (always objectionable when dealing with such liquors as sewage) the pumps are set slightly below the level of the sewage at its highest point in the well, and provision has been made for automatically removing the gas given off from the sewage which accumulates in the casing of the pumps and would otherwise prevent the discharge of the sewage.

The sludge pump is a special centrifugal type, having an open type impeller with an easily-removable cover plate for inspection and cleaning of the interior. This pump has 5-in.

suction and discharge branches and is capable of discharging nearly 1½ tons of sludge per minute. The head, including friction, is approximately 25 ft. The driving motor is 6-b.h.p. shunt-wound, running at 950 revolutions per minute. A special starting switch and shunt regulator are fixed on a wall panel near the sludge pump for the easy control by the attendant, and the foot valve on the suction pipe is avoided by the use of an exhausting pump placed alongside. The connecting pipe to the exhausting pump is fitted with a sight glass to indicate to the attendant when the sludge pump is properly primed—an operation of a few minutes.

The general contract has been carried out by Messrs. Currall, Lewis & Martin, of Birmingham. The contractors for the screening and detritus machinery were Messrs. S. S. Stott & Company, Haslingden, near Manchester. The contractors for the whole of the pumping and electrical machinery were Messrs. The Pulsometer Engineering Company, of London and Reading.

Mr. E. M. Richards, ASSOC.M.INST.C.E., the borough surveyor, gave general assistance with local matters.

LAW QUERIES AND REPLIES.

Edited by J. B. REIGNIER CONDER,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

ERECTING BUILDING WITHOUT PLANS, AND WITHOUT OTHERWISE CONFORMING WITH THE BY-LAWS.—"Port" writes: In 1889 plans were submitted to my council for the erection of a chapel house and passed. An open space at the rear is more than sufficient in area, but the distance across in one corner is only 4 ft. 6 in. whereas it should be 15 ft. laterally throughout the entire width of the house as provided by Article 54 of the Building By-Laws (Model Series) in force in the district since 1880. Last month I observed that a new building had been built (in place of both a wood house and a covered ashpit now removed) on the said open space, without submission of plans as required by Sub-section 92 of the by-laws. This new building is intended as a washhouse, and its erection on the open space constitutes apparently a further breach of Article 54. In reply to my notification of the breach of Article 92 as to the deposit of plans, the chapel authorities write regretting the transgression and intimating that they had been advised by the contractor that it was unnecessary to deposit plans. The letter further suggests that there is ample space around the house (although the distance across at a particular spot is limited), and that if the by-law is broken in the letter it is amply fulfilled in the spirit, and expresses a hope that the council will not raise any objection to the building remaining as it is. Will you kindly advise (*a*) as to whether the fact of the house having been built contrary to the by-laws with the consent of the council will affect the power of the council to take proceedings for this further breach of the same by-law; (*b*) whether, as the open space is more than sufficient, this, coupled with the fact that the back yard abuts upon a road 20 ft. wide, would have any consideration with the magistrates; and (*c*) what is the first and proper procedure to be taken in the circumstances?

(*a*) No, in my opinion it will not. (*b*) Yes, I think these facts would probably have some influence with the magistrates. (*c*) In the case of *Governors of Repton School* v. *Repton Rural District Council* (decided in November, 1917), Mr. Justice Bailhache held that a by-law similar to by-law 54 was unreasonable and invalid, and in view of that decision I think it would be useless for the council to take any proceedings in this case.

PRIVATE STREET WORKS.—"D. C. N." writes: There is an old public road in this district which was originally bounded on one side by a ditch. This ditch having become partly silted up, the district council about two years ago caused it to be piped and covered in, and it has since been used as part of the road. The road has never been formally adopted or sewered, and is now very much out of repair. I shall be much obliged if you will advise me whether the council can have the road (including the site of the ditch) made up and sewered at the expense of the frontagers on each side.

Assuming that the road became a public highway before the passing of the Highway Act, 1835, it is "reparable by the inhabitants at large." And if the ditch was necessary for the purpose of the highway, the presumption is that it formed part of the highway, and in that case the frontagers cannot, in my opinion, be compelled to pay the expense of making up or sewering either the old road or the site of the ditch. See *Chorley Corporation* v. *Nightingale* (97 L.T., 465).

SURFACE-WATER SEWERS: RIGHT TO DISCHARGE INTO STREAM.—"Silt" writes: There are several streets in this district with separate sewers for sewage and surface water. The surface-water sewers are furnished with the usual gullies and catch pits, and discharge into a small stream, which flows through a private estate. In consequence of heavy rainstorms, a quantity of silt and sand has been carried by these sewers into the stream, partially choking the channel in some parts, and the estate owner has made a claim against the council for damages. Will you kindly advise me whether they are liable?

In my opinion the council are not liable; sec. 17 of the Public Health Act, 1875, provides that nothing in the Act is to authorise a local authority to make or use any sewer, drain, or outfall for the purpose of conveying *sewage or filthy water* into any natural stream or watercourse until such sewage or filthy water is freed from all excrementitious or other *foul* or *noxious* matter, such as would affect or deteriorate the *purity* and *quality* of the water; and it has been held that surface water which carries with it sand and silt is *not* "sewage or filthy water" within the meaning of the section, and that it may be discharged into a stream. See *Durrant* v. *Branksome Urban District Council* (76 L.T., 739).

REFUSE REMOVAL: TRADE REFUSE.—"Laundry" writes: The council have undertaken the removal of house refuse in this district. I shall be much obliged if you will advise me whether they are bound to remove clinkers from the boilers of a steam laundry, and if so whether they can charge the occupier for so doing?

In my opinion these clinkers are not "house refuse," but "trade refuse." See *London and Provincial Laundry Company* v. *Willesden Local Board* (56 J.P., 696). If sec. 48 of the Public Health Acts Amendment Act, 1907, is in force in the district the council must remove the clinkers, as "trade refuse," if requested so to do by the owner or occupier of the laundry, who must pay a reasonable charge, the amount thereof, in case of dispute, to be settled by a court of summary jurisdiction. If this section is not in force there is no obligation on the part of the council to remove "trade refuse" at all, either with or without payment.

MOTORS AND MUNICIPAL WORK.

ELECTRIC VEHICLE COSTS.

In his last issued annual report Mr. W. Greig, cleansing superintendent to the Glasgow Corporation, refers to the working of two 2-ton electric vehicles put into commission in December, 1916, and May, 1917, respectively. A comparison with horse haulage derived from the figures for the past year shows the following:—For electric vehicles, 3s. 5½d. per ton; for horse traction, 4s. 1¼d. per ton.

Two electric tipping wagons have been used collecting house refuse in Chester since the summer of 1915, and up to the end of December, 1917, they had travelled 13,688 miles, collected and carried 5,974 tons of house refuse, delivered 217 tons of fuel to the electricity works, and conveyed 167 tons of shell and 256 tons of scrap steel to the railway station. According to the report of the city electrical engineer, Mr. S. E. Britton—quoted in *Motor Traction*—the working expenses amounted to £524 2s. 8d., or 9·19d. per mile. There was received for the cartage of the fuel, shell, &c., a sum of £48 2s., so that the nett cost for the cartage of the refuse was £476 0s. 8d. These two vehicles have displaced or performed the work of six horses and men, which it is estimated would have cost for hiring £1,506 14s.

Hythe Town Council have completed arrangements for the purchase of a motor tractor for the collection of house refuse.

Westminster Road Sweeper's Exemption.—Four months' exemption was granted by the House of Commons Appeal Tribunal on Tuesday to a road sweeper employed by the Westminster City Council. Sir Donald Maclean said that he was a very useful man, and that if the Westminster Council did not want him he was sure there were plenty of other councils in London who would. The exemption was conditional on the man continuing as a road sweeper, but not necessarily with the Westminster Council.

Whitley Council for Water Undertakings.—A meeting was held last week at the offices of the Ministry of Labour in order to discuss the question of the formation of a joint industrial council under the Whitley scheme to deal with the employers and employees concerned in the various water undertakings throughout the country. Representatives were present from both municipal and privately-owned water undertakings, and also representatives of the various unions concerned. Ultimately it was agreed by all parties concerned to form such a council, and the main principles were decided upon. These are to be submitted to the undertakings and the men's unions, and will come up for confirmation later.

Road Transport Order, 1918.—The secretary of the Commercial Motor Users Association has communicated with the Road Transport Board with reference to the position in which the numbers which have been issued by the board and which have to be displayed upon the vehicles should be placed, and has received a reply from the secretary to the board stating that so long as vehicles are legibly marked with the transport registration number the board do not intend to insist that the number should be placed in any particular position. It is, however, suggested that the number should be marked on the near-side of the vehicle following the name and address which is already, in most cases, thereon.

Public Works at Middlesbrough.

By S. E. BURGESS, M.INST.C.E., Borough Engineer and Surveyor.*

Middlesbrough is a North country busy industrial town of comparatively modern development. The principal industry is steel manufacture. Many other important industries, including shipbuilding, coal export, &c., are carried on. The area is 4,320 acres. The population may now be taken at, say, 126,000.

STREETS AND ROADS.

Total mileage of the streets and roads in the borough is 145, made up as follows: Hard wood, 4 miles; creosoted soft wood, 4 miles; sett paving, whinstone, &c., 32 miles; tar macadam, 10 miles; ordinary macadam, 55 miles; back streets, 40 miles.

The average maintenance pre-war figures was as follows: Ordinary macadam, £168 per mile; Tarmac, £63 per mile; paving wood and setts, £32 per mile.

For the sweeping and cleansing of streets, including disposal of sweepings and slop, average pre-war cost was: Ordinary macadam, £124 per mile; Tarmac, £41 per mile; paved road, £22 per mile.

The main thoroughfares are very good and wide, and the modern development of the town during the last ten to fifteen years has been very satisfactory. The town is laid out on the "gridiron" principle, with easy connecting main roads serving each sub-district of the borough.

Considerable work in the improvement of the streets has been taken in hand, particularly so during my service with the corporation. Before the war the town was in this respect progressing most rapidly, and the modern construction in the making up and paving of existing and other roads and streets was being pushed forward. From 1909 to the present time 14 miles of the principal thoroughfares have been repaved, 8 miles with hard and soft wood, and the remainder with whinstone and granite setts and cubes, all laid on a concrete foundation at least 6 in. thick—in some cases, that is on the most important roads, the foundation of concrete is 8 in. The average cost of this work is £9,000 per mile.

The pre-war figure for hard wood, including concrete foundation, was 14s. per square yard, and for soft wood, 10s. 6d. Whinstone cubes cost 9s., including foundation, and granite setts, 11s. and 12s.

Sixteen miles of private street work has been carried out since 1909 at an average cost of £5,900 per mile. These streets in nearly every case (except Tarmac) are "paved" on a concrete foundation, and many of them have grass verges at each side of the carriageway.

On street works alone an expenditure of £200,000 has been incurred during the last ten or twelve years.

MAIN SEWERAGE AND DRAINAGE.

With regard to main drainage, there are seven main outfall sewers which discharge into the tidal waters of the river Tees. The area of the town is sectionalised into separate districts, each having its own outfall to the river. Middlesbrough is very flat; consequently there has been considerable difficulty with respect to main drainage. In some of the areas serious flooding has occurred at heavy rainfall, particularly when the fall coincides with times of high water. The area formerly draining to Cargo Fleet was found too large, brought about to a great extent by the growth of the town. The main sewers for this district were too small, so much so that portions in and around the marshes and also in and about Newport-road were generally flooded at heavy rainfall, particularly at high tide. As many as 400 houses and thirty streets were flooded in the years 1909, 1910 and 1911.

The corporation therefore in 1912 ordered that a scheme for the better drainage of the marsh district should be prepared. This was done, and the approval of the Local Government Board obtained. The total estimated cost of the scheme was £60,000, and was generally approved.

The corporation decided, in the first instance, that they would carry out part of the scheme including the Snowdon-road Pumping Station. The estimated cost of this portion of the work was £35,000, and it has now been successfully carried out at a cost of some few hundreds under that figure.

The work carried out comprises a 7-ft. diameter main trunk sewer with a tidal outlet to the river Tees opposite Snowdon-road. On its course at Snowdon-road a new pumping station has been provided so that at high water rainfall and sewage is pumped to the outlet discharged at the river. The discharging capacity of the sewer is 3,318,000 gallons per hour, the calculated requirement for the area draining thereto providing for one-third of an inch rainfall per hour, and sewage and slop-water 2,100,000 per hour. At low water the sewer discharges by gravitation. At heavy rainfall with low tide no pumping is necessary. At half tide and rainfall also no pumping is necessary. At high tide and above half tide (at rainfall) pumping is required, and at these times the pumping plant is put into operation.

Since 1909 an expenditure for main sewerage and drainage to the extent of £132,000 has been incurred.

HOUSING.

The number of new houses at present required to meet normal demands is 1,500, and the number of houses that should be built per annum after the war, allowing for demolition and the growth of the town, is at least 300.

The total number of houses erected by private enterprise in Middlesbrough during the last seventeen years has been 5,937—say 6,000—an average of 350 per annum.

Until 1909, when the Finance Act came into operation, building operations in Middlesbrough were fairly active. From that date building went down, but not so very much; but since the outbreak of war the erection of houses, in common with other places in the country, has practically ceased.

TOWN PLANNING.

A scheme for the town planning of the unbuilt-up portion of the borough has been prepared, and it is designed that ample provision is made for arterial main roads, and ring or joining-up roads, leaving the filling in of the intervening building estates to be arranged by landowners, architects and surveyors in the development of their land.

The number of houses permitted to the acre until the town-planning suggestions and schemes came into operation was similar to other places, and as many as forty and more houses to the acre have been erected. This, however, is now a thing of the past. The town plan is so arranged by "spotting" the various districts that a number not exceeding seventeen to the acre have been erected since 1912. It is hoped that some limit, say twelve or fourteen to the acre, will be the standard arrived at for the future development.

An important matter now before the corporation is the laying out of a grand trunk road to run parallel with the river Tees, starting at Middlesbrough and thence going on to the new Garden City at Warrenby ("Dormanstown") and further on to Redcar. The suggested width of this road is 80 ft. On each side of the road future development of Greater Teeside will take place. On the south of the road residential and such-like estates, on the north side—that is, next to the river—works, manufactories and extensive undertakings of large rateable value will be provided for. It is pleasing to report that all the local authorities interested are in agreement with the town planning of the district on the lines now indicated.

The corporation of Middlesbrough have also in hand a small housing scheme—viz., the erection of 160 houses which are to be built on garden colony lines for the Newport district. A model garden village is to be arranged with houses at fourteen to the acre. Each site is a war plot of land—*i.e.*, every house will have its own garden plot of at least 300 sq. yds. The scheme is now before the Local Government Board. The estimated cost (pre-war figure) is £30,000.

SANATORIUM NEW LAUNDRY AND NEW TUBERCULOSIS PAVILION.

The corporation sanatorium is a very extensive block of buildings. From time to time these have been added to and extended. In 1912 and 1913 two additions were made, one, the tuberculosis pavilion, being erected to meet the requirements of the Insurance Committee for consumptive patients. The hospital was designed so that a figure of about £100 per bed was arrived at. The total cost was £3,200.

At the same institution in 1913 a new laundry was erected. This building comprises everything necessary, and is an up-to-date structure for carrying out the washing and laundry work in connection with a large institution. It includes laundry and washing machinery of the latest type, supplied by Messrs. Thomas Bradford & Compnay, of Salford, including steam drying, &c. The cost, including machinery (£1,150), was £3,150.

MARGINAL ROADS.

In the Linthorp and Grove Hill districts many new roads have been carried out, some Tarmac, others paved, and are locally known as marginal roads, that is, the width of the carriageway has been reduced to a minimum requirement of 19 ft., in some cases more, and the grass verges or margins intervene between the carriageway and the kerb of the flagged footway.

Proposed Purchase of Middlesbrough Tramways.—Middlesbrough Town Council have decided to exercise the right of purchasing the tramway undertaking in the town owned by the Imperial Tramways Company.

* From a paper presented at a meeting of the Institution of Municipal and County Engineers held at Middlesbrough.

National Salvage.

DISCUSSION AT CLEANSING SUPERINTENDENTS' CONFERENCE.

At the recent annual conference of the Institute of Cleansing Superintendents, a paper entitled "Possibilities of Salvage and Utilisation of Waste" was presented by Mr. David Currie, Director-General of National Salvage, this being followed by an address by Mr. J. C. Dawes, technical adviser to the National Salvage Council, on the subject of "Municipal Salvage." Mr. Currie's paper was reproduced in our issue of the 30th ult., and that of Mr. Dawes in the issues of the 6th and 13th inst.

Mr. W. J. Heavey, superintendent of cleansing to the City of London, in opening a discussion on the matters dealt with, expressed the opinion that the National Salvage Council had been a complete failure because it was based on a voluntary system. All national organisations of a voluntary character had ended in comparative failures. The National Salvage Council did not go far enough. Food controllers had done splendid work, but it was impossible to get people voluntarily to save what they had paid for. To ask them to save bread, rags, old metal and other things people had paid for was to play with their intelligence. People would never save what they had to pay for unless they were compelled. The commodities could be saved, but the National Salvage Council was on the wrong track. To ask people to save waste paper, &c., was to take hold of the wrong end of the stick; they must commence at the other end. In the City of London quite 30 tons of waste paper was saved every week, but it was a small amount for London—it could be easily doubled or increased to 90 tons weekly if properly organised. Powers should be given to the corporations, who should direct the collection of waste; salvage must be made compulsory if it is to be a success. The people were ripe for compulsion, and if they were told what to do they would willingly do it if it was a national necessity, and as public officers they were prepared to do their share. Mr. Currie had set a high standard on voluntary salvage, but the 100 per cent would never be reached by voluntary effort. Waste food should be collected and utilised in a regular and organised way.

Alderman Roberts (Liverpool) said the increase in revenue by the salvage and utilisation of waste, as given by Mr. Currie, was colossal. If the 100 per cent could be salved they would be on safe ground; but that was too much to expect. One of the main objects, however, of the institute was to save life, and that should be the first consideration of the corporation and the cleansing superintendent. Since the inauguration of that institute twenty years ago, the death-rate in the large towns had been greatly reduced. Ten years ago New York was making £45,000 a year out of rubbish salvage—what must they be making now with the enhanced prices of raw material? In Liverpool, millions of units of electricity were generated from what was looked upon as rubbish, which was sold to the electricity works at a small price for which the corporation got a good return. They had devoted much time and thought so that they could deal with their waste in a practical way. £25 per ton was realised from their poultry meal, which was made from fish offal, and there was a ready sale. Butchers' offal was ground down and mixed with bone meal for feeding pigs and poultry, and a good price was obtainable. The waste from houses, amounting to 20 tons weekly, was collected, dried, and made into meal for poultry, for which they obtained a ready sale at £15 per ton, and poultry keepers had told him that the hens fed on this meal hardly ever ceased laying. By a systematic method they collected from certain houses at least 800 tons of waste per annum. Quite recently 25,000 damaged eggs which arrived in Liverpool were boiled hard and made into food for pigs or poultry. He hoped the institute would continue to do a national service.

Mr. W. Greig, cleansing superintendent, Glasgow, referred to the remarkable statements made by Mr. Currie, and the wonderful increase in waste salvage. Mr. Currie argued that they should go on with national salvage irrespective of whether it paid or not. That was a somewhat difficult problem from a Scotsman's point of view, and as he had travelled a good deal in England, he found that to do work that did not pay was not acceptable to others beside those north of the Tweed. But the salving of waste material was a paying proposition, and in Glasgow, long before the war, the work of salvage and utilisation of waste was in operation, and it paid them for their labour. The revenue for the last ten years from what would otherwise have been waste was £50,300.

Mr. A. Findlay, cleansing superintendent, Aberdeen, said they had been going in for saving all round since the war broke out, and always trying to learn something and go one better. But local conditions had to be considered in respect to salvage and utilisation of waste—small places like Aberdeen could not compete with large cities like Liverpool or Glasgow. Mr. Findlay referred to questions sent to them by at least two Government Departments. Those questions were very similar in each case, but he did not know which department was responsible for this overlapping. Two years ago they started collecting kitchen refuse in Aberdeen (and he organised part of the city) afterwards handing it over to the pig dealers. He now had about sixteen districts organised for collecting kitchen refuse, and he was collecting about 10 tons per week. The system of collecting was working very satisfactorily, and they sold at a price that covered the cost of the collection. They were losing nothing, and he did not think it right for a corporation to make a profit out of what had cost them nothing. They had fifty pigs at the municipal piggery; it was a new industry, but they were going to have more. Nearly all the pig dealers were getting a portion of the kitchen waste collected. One speaker had declared against voluntary service. Mr. Findlay thought it would not be a failure if the people were properly appealed to. There was a lot of material they did not know what to do with.

Mr. J. A. Priestley, Technical Adviser to the National Salvage Council, and cleansing superintendent, Sheffield, wished to speak as a representative official of the Salvage Council, and also as a municipal official. The question had been raised as to the wisdom of a salvage scheme—whether it does or does not pay—how is it going to affect us from a £ s. d. point of view, which was the view supposed to be taken by Yorkshiremen and Scotsmen. In salving waste material, they wanted to make sure there was something in it that would pay. Alderman Roberts referred to what had been done in Liverpool in the way of dealing with refuse as a generator of electricity. All house refuse contained steam-raising power, therefore it had a financial value. Some sixteen years ago comparative results were compiled as to the cost of refuse destroyed by a destructor. Mr. Priestley referred to experiments made in Sheffield, and small operations had taken place in six or eight other localities, and the additional returns had raised the average over and above the figures he got in Sheffield, but he would take the lowest figures (those of Sheffield) as the value to be obtained. Mr. Priestley proceeded to give a comparison of results of destroying and screening 100 tons of house refuse. The cost of labour or burning 100 tons of house refuse for a day was £6 13s. 4d. (1s. 4d. per ton); removing 40 tons clinker, £5 6s. 6d. (2s. 8d. per ton); total £12. At one lb. of steam per lb. of refuse, this would have a value of $\frac{1}{8}$ that of steam coal; therefore 12½ tons of steam coal at 25s. per ton worked out at £15 12s. 6d. plus cost of firing at 51s. per week, making a total cost of £16 12s. 1d. This gave a nett value of £4 12s. 1d. for 100 tons of refuse. The cost of screening 100 tons of refuse worked out at £16 19s. 11d. as follows: One man attending screen, 8s. 6d.; sixteen women sorting at 5s., equals £4; removing 56 tons of dust at 2s. 8d., equals £7 9s. 4d.; power oil, cleaning materials, 10-h.p. motor equals 10s., add loss of value of refuse as above, equals £4 12s. 1d. The value of salved material (Sheffield percentages) was as follows: 30 tons cinders at 10s., equals £15; 1 ton tins, equals £5; 8 cwt. rags at 12s., equals £4 16s.; 1 1-5 cwt. paper at 8s. 6d., equals 10s. 2d.; 1 4-5 cwt. bones at 20s., equals £1 16s.; 12 cwt. glass at 1s. 6d., equals 18s.; total, £27 0s. 2d.; less cost as above, £16 19s. 11d., bringing the value of salved material to a total of £11. Those towns using water got good results for their refuse. They obtained best value from a steam-raising proposition. The average evaporation value was equal to 5-7 of the value of steam coal. From 100 tons of coal they got 30 tons of cinders. After going into detail as to the value of refuse, steam and coal, Mr. Priestley stated that 100 tons of refuse yields 224,000 lb. of steam (say 11,200 h.p.), and 31 tons of cinders yields 395,808 lb. of steam (say 19,790 h.p.). The nett result in value of screening 100 tons of town's refuse as a steam-raising power was £11. As to the desirability of a 100 per cent salvage, as mentioned by Mr. Currie, he was afraid they would never get it, but he would not say that voluntary service was going to be a failure, as Mr. Heavey had declared. Compulsion had been necessary in many parts of their national life. They should remember, however, that by the voluntary system they raised a very good army, but they had been compulsorily rationed in many things. As an official of a municipal authority he voiced the feeling of many others when he complained that there was a good deal of overlapping in Government Departments, and they got rather tired of individuals and committees of different departments coming to them for information on similar lines. The work ought to be carried out at a public centre by one authority, and local authorities should combine to see there was only one distinct and authoritative body, so that they should no longer be pestered by going into the same set of questions and answers for two or more different bodies.

(To be concluded.)

Maintenance of Roads in Rural Areas.*

By JAMES A. WEBB, Engineer and Surveyor to the Hendon Rural District Council.

The maintenance of highways in rural areas has become a matter for serious consideration owing to the greatly increased cost and altered conditions of traffic. It may therefore be of some slight interest to call attention to the recent developments and deterioration caused by heavy and other vehicular traffic on road surfaces in the rural districts in various parts of the country where the local conditions differ and the methods adopted in maintenance are carried out under varying circumstances.

The object of this paper is, primarily, to give the experience of various engineers and surveyors with respect to the cause of deterioration of road surfaces and the methods adopted for reinstatement, with a view to obtaining the opinions of those members who have charge of roads outside the more densely populated districts where the conditions and traffic differ.

The cause of deterioration may be different in nearly every district owing to the construction of the foundation of the carriageway, nature of subsoil, material used, drainage and nature of traffic, particularly where farming interests are involved. The damage caused by wheels coated with soil or manure, particularly during the autumn and early spring, is in many districts very serious and needs special attention. Many sections of roads are subjected to heavy hauling by farm wagons and the surfaces destroyed, rendering them dangerous to cyclists or light motor traffic. Whilst having every consideration for the farming interests, it is only fair to point out that rural district authorities have no power to cause the wheels of such vehicles to be cleaned before use on the highway. The result is that rural authorities have many complaints from motorists and others.

FOUNDATIONS.

Many of the highways in rural areas were originally imperfectly constructed and have neither foundations nor drainage, being simply a more or less thin crust of gravel or metal on clay, or other similar subsoil. The result of the altered conditions of traffic using these roads is soon in evidence, not only by depressions and irregularities in the surface, but in many instances by the total destruction of considerable stretches of the carriageway, which necessitate entire reconstruction of that section.

SUBSOIL.

Where the subsoil is clay and the construction of the carriageway is irregular and drainage imperfect, the effect of the fluctuating traffic is very serious. In many instances the camber of the road is entirely altered, the haunches and channels become higher than the centre and consequently water lies on the surface. The thin crust becomes disintegrated very rapidly and the road surface is destroyed.

MATERIALS USED IN CONSTRUCTION.

In many road districts the carriageways which are now subjected to exceedingly heavy traffic were originally constructed entirely with gravel, particularly where suitable material could be obtained in the locality. The aggregate, being round and smooth on the surface, had little binding or adhesive properties, and consequently during the summer months the entire surface of the road becomes loose and in some instances is a source of danger not only to horse traffic but cyclists and pedestrians. This is particularly noticeable in districts where agriculture is the predominating industry. Numerous complaints are received in consequence, and the unfortunate surveyor has to bear the burden.

These conditions are now rapidly disappearing on the principal roads in nearly all districts, owing to improvements made by substituting granite and slag in resurfacing.

In many districts the use of tarred material in various forms has, during recent years, proved a great advantage to users and created economy in upkeep, as the cost of watering and scavenging is greatly reduced.

Where the road surfaces, either water-bound gravel or granite, have been tarred, the dust on the foliage of trees and hedges is very much reduced, and gardens in front of houses adjacent to the highway, which were previously seriously affected by the dust raised by fast vehicular traffic, have to a considerable extent resumed their pleasing features.

Trees overhanging highways in most rural districts are detrimental to road surface, as they cause an obstruction to light and air; but by judicious trimming this can be overcome, and the rural aspect of our highways maintained.

HEDGES.

It may be frequently observed that the hedges abutting on the roads at each corner of cross-roads and junctions, also at sharp curves, are a great obstruction to vehicular traffic, where they are permitted to grow to such heights and density as to obstruct the view of drivers of vehicles in roads which are in most instances at right angles with the highway, where traffic is passing in the opposite direction, and a source of danger to pedestrians. Numerous accidents are caused which might be avoided if the hedges were cut back and lowered for sufficient distance to permit the driver to obtain a view of the road which he is desirous of using.

DRAINAGE.

The drainage of the carriageways is perhaps the most serious problem for a surveyor in a rural district, as the only means of drainage is by roadside ditches into which the storm-water is conducted principally by means of grips cut in the greensward. These ditches or watercourses are generally cleansed by the farmer or adjoining owner of the land and are a great source of trouble and anxiety to the highway surveyor, as he is compelled to serve notice to have the ditches cleaned out, and in some instances there is great difficulty in getting the work done in a satisfactory manner. The result is that water remains for considerable periods on the surface and channels of the road, which in the absence of footpaths is a great inconvenience to pedestrian traffic.

TRAFFIC.

The condition of the traffic now using the highways necessitates altered methods of construction and maintenance of road surfaces, as many of the highways in rural areas are subjected to both heavy and fast moving traffic, motor omnibuses, &c.

Both heavy motor lorries and fast-moving vehicles seriously affect the road surface by disintegration and corrugation, particularly by improperly-balanced vehicles, method of construction, position of the springs, type of tyres, excess weights, width of wheels and various other factors. Many of these effects could be minimised in an improved construction of vehicles, but this no doubt will be an accomplished fact in the near future.

It would appear almost incredible that some roads in rural districts are subjected to traffic exceeding 500 tons per yd. sup. in twenty-four hours. These figures are confirmed by census of traffic recently taken.

Timber haulage is in many districts a serious problem, as it is difficult to prove a case for extraordinary traffic which could be solely attributable to this cause; but as the timber is principally consumed in national work, some serious consideration to this matter should be given by the State with a view to making a grant on a percentage of the cost of reinstating the road surfaces, as it is manifestly unfair to the smaller local authorities, who are burdened with the total cost of the highway maintenance.

SURFACING WITH TARRED CLINKER.

In some districts considerable success has been achieved in resurfacing the carriageways of roads in rural or outlying districts by the use of destructor clinker when broken to a uniform size and mixed with the proper proportion of tar. In some districts the material is used directly after being mixed, in others it is stored for some weeks. Each system appears to give equally satisfactory results, and where the material can be obtained there would appear to be a great advantage in its use, both from an economical and utility point of view.

Beyond patching and filling in potholes on the surface, the author has had little experience in the use of this material; but where it has been adopted on fairly large areas the road surface, after being surface-tarred and covered with granite or slag chippings, presents a regular and uniform contour, and in some instances it has been subjected to omnibus and other heavy traffic with excellent results.

There can be no doubt that the use of suitable material from a refuse destructor when properly mixed with some tarry or bituminous substance has proved a great benefit to those authorities possessing destructor plants.

Whether the clinker is used as a base and the wearing surface covered with asphalt or other suitable material, whether it is used as a resurfacing material laid as a carpet on the existing road surface when suitably prepared, it is an economic method of utilising what has been practically so far a waste product for the maintenance, resurfacing and general upkeep of highways subjected to a considerable amount of heavy traffic.

The system commends itself to all those who have facilities for its production and use. Experiences in different districts have proved this, apart from an economic point of view in construction (which can be carried out under unfavourable weather conditions), the absence of dust, reduction in cost of scavenging, watering, &c.

(To be concluded.)

* Paper presented at the annual meeting of the Institution of Municipal and County Engineers.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Barnard Castle U.D.C.—The council have purchased property in Galgate for £330 for the purpose of constructing a public convenience.

Stirling T.C.—The new municipal buildings have been completed, and a report has been submitted showing that the total cost of the structure was £38,511.

REFUSE COLLECTION AND DISPOSAL.

Deptford B.C.—It was reported that the profit on the collection of waste paper in the borough worked out at the rate of £85 a year.

Ossett T.C.—It has been resolved to apply to the Local Government Board for sanction to borrow £1,000 to cover the cost of suggested alterations to the stables in Illingworth-street, and for the purchase of horses, carts, harness, &c., to enable the committee to carry out scavenging work by direct labour as from January 1, 1919.

Swansea T.C.—The Health Committee have appointed a small committee to visit towns where schemes of salving house refuse are in operation and report to the town council.

ROADS AND MATERIALS.

Antrim C.C.—Steps are to be taken to have the statutory limit of expenditure for road maintenance increased.

Beeston U.D.C.—It was reported that women labour had been engaged for street cleaning and tar-spraying. Their duties also included work connected with salvage at the farm.

Chepstow R.D.C.—It was reported that the Great Western Railway Company had consented to bear the cost of constructing a new road from the Garden Suburb at Severn Tunnel.

Driffield U.D.C.—The War Department have consented to make a contribution towards the repair of St. John's-road in consequence of the damage caused by military traffic.

Halstead R.D.C.—The surveyor, Mr. W. H. Eade, reported that Lieut.-Colonel N. Mowat had expressed satisfaction at the generally good condition of the roads, saying he thought the council had shown great patriotism in keeping the roads in such good condition during this very trying time, and that he was prepared to recommend the War Office to send the council a cheque for £150. At the same time he informed the surveyor that the council had no legal claim for damages, but that it was the wish of the War Office to help local authorities, especially where the roads were being well cared for.

Lancaster T.C.—The town council are considering a scheme for an improvement in King-street, along which the tramway runs.

Middlesbrough T.C.—Among the improvements contemplated in the construction of an 80-ft. trunk road to run parallel with the Tees and going to the garden city at Warrenby, Dormanstown, and Redcar.

Portsmouth T.C.—The Road Board having intimated that they were unable to give permission for a supply of asphalt as this material had been requisitioned by the Government, the town council acquiesced in the proposal of the borough engineer Mr. A. W. Ward, to make use of "British asphalt," which, if sufficient granite could be obtained, would, the Roads and Works Committee considered, be a useful substitute.

Rugeley U.D.C.—Attention having been drawn to the bad state of several footpaths, the surveyor, Mr. W. E. Rogers, was asked to experiment with tar and chippings for their repair.

Scarborough T.C.—The borough engineer, Mr. H. W. Smith, and a small committee have been appointed to consider and report upon the scheme of the owner of the Marine Parade property for making a modern arcade there, plans of which are now before the corporation and in connection with which efforts are being made by the Streets and Buildings Committee to carry out a desirable public improvement at the place. It is proposed, in negotiation with the owner of the property, to include a public street improvement by abolishing the steps at Marine Parade, and by widening it so as to make a grant of £400 towards the cost of tar-spraying the main vehicles could traverse from the top of St. Nicholas-gardens to the Grand Hotel.

Southend T.C.—The Road Board has intimated that it will make a grant of £400 towards the cost of tar-spraying the main thoroughfares.

Tregaron R.D.C.—Upon the application of the surveyor the council appointed a committee to deal with the condition of the roads consequent upon damage caused by timber haulage. The surveyor said it was heartbreaking to see the state of the roads after twenty years' efforts to improve them. He had, he said, plenty of stones on hand, but the roads needed the steam roller.

WATER, GAS, AND ELECTRICITY.

Blofield R.D.C.—The water supply at Halvergate was discussed upon a recommendation, based on medical authority, to close the two district wells. This step was deprecated by several councillors as too drastic, and the clerk said that, as a last resource, the council could sink a well and charge the district with the cost. Mr. E. A. Smithdale thought it was idle to talk about artesian wells, for it was a matter about which only experts knew. They would probably have to bore about 2,800 ft. to get to the chalk, and after £1,000 had been spent they would not have finished with it. Incidentally, a letter came from a water diviner offering his services, but no action was taken with respect to this. In the end the council reluctantly concluded to close the wells, as advised.

Holmfirth U.D.C.—Upon the recommendation of a committee the council have agreed to engage the services of a water diviner for the discovery of water on the council's land at Bradshaw.

Hythe T.C.—The Local Government Board having sanctioned the borrowing of £4,300 for water supply purposes, the borough surveyor, Mr. J. S. Green, was authorised, as an initial step, to relay the water main in Blue House-lane, at an estimated cost of £850.

Fulham B.C.—The Electricity Committee have submitted a recommendation for electricity mains extensions and the equipment of a new sub-station, at an estimated cost of £1,680.

Motherwell T.C.—The new pumping station at Garrion Bridge was formally inaugurated last week. By the new scheme the water supply will be practically doubled, as the pumping plant when completed will be capable of delivering to the Waterloo tank 4,500,000 gallons of water in twenty-four hours.

Stirling T.C.—The burgh electrical engineeer has been asked to report on a suggestion by the Controller of Coal Mines for the provision of condensing plant at the electricity station, in view of the necessity for economising coal.

SEWERAGE AND SEWAGE DISPOSAL.

Glasgow T.C.—In the course of an official visit by members of the Sewage Committee to the Shieldhall sewage works, the convener, Mr. James A. Stewart, stated that the modern methods adopted by Glasgow for the disposal of the sewage had an important bearing on the health of the city. He looked forward to the time when the neighbouring towns would follow the example of the Glasgow Corporation, and by dealing with sewage on modern lines would not only produce a valuable product for agriculture, but also would create a Clyde as pure as the time when St. Mungo came to its clear waters.

Norwich T.C.—The town council have appointed a special committee to investigate and report on the treatment and disposal of sludge.

Warmley R.D.C.—The medical officer, Dr. Aubrey, having submitted a report of the alleged nuisance caused by the Bath sewage works, the council resolved to write to the Bath City Council on the subject, and also to make the Local Government Board acquainted with the complaint. The deputy surveyor, Mr. Bevan, stated that the Keynsham Council were strongly against the alleged nuisance.

MISCELLANEOUS.

Exeter T.C.—The city council have adopted a proposition for the cutting of peat on Dartmoor in order to supplement the shortage of coal, and it is suggested that German prisoners should be engaged to do the work.

Local Authorities and the Disabled.—Brighton Works Committee have resolved that the borough surveyor should give preference to discharged soldiers and sailors in filling vacancies in his department.

Municipal Waterworks Association.—The annual general meeting of this body will be held at Birmingham an Friday next, the 4th inst., at 2 p.m. Mr. J. Parry, M.Inst.C.E., will read a paper on "Afforestation"; Mr. C. G. Henzell, M.Inst.C.E., another on "National Control of Watersheds and Other Sources of Water Supply." A visit has been arranged to the Frankley waterworks on the following day, comprising the terminal reservoir on the Elan aqueduct, fine sand filters and pumping station.

PERSONAL.

Mr. H. Evans, surveyor to the Sandgate Urban District Council, has recovered from his recent indisposition.

Mr. J. Johnson, assistant borough surveyor of Gateshead, has received an appointment under the Department of Works and Buildings.

Mr. J. Barker, surveyor to the Sudbury Rural District Council, has been appointed coal overseer for the rural district at a salary of £30.

Mr. J. S. Green, borough surveyor and sanitary inspector of Hythe, has been voted an increase of his salary as sanitary inspector of £50.

Mr. W. F. Y. Molineux, engineer and surveyor to the Ulverston Rural District Council, has had his salary increased by £50 a year.

Mr. William Forbes, formerly traffic superintendent of the Aberdeen tramways, has been appointed manager in succession to Mr. R. S. Pilcher, who was recently appointed manager of the Edinburgh tramways.

The engagement is announced between Major Harry Percy Maybury, R.A.F., only son of Brigadier-General H. P. Maybury, C.B., Barnsfield, Greenhithe, Kent, and Evelyn, second daughter of Mr. S. K. Keyes, The Dene, Dartford, Kent.

Mr. Andrew Warren is recommended by the Devon Main Roads Committee as surveyor for No. 3 division at a salary of £350, rising by £10 increments to £400, with £250 for expenses, and it is also proposed that the salary of Mr. F. E. Simpson, acting surveyor for No. 2 division be increased to £400.

Mr. W. Plows, surveyor and sanitary inspector to the Sherburn Rural District Council, who intimated that he wished to resign on the grounds of overwork and ill-health, has been voted a war bonus of £15 a year, and promised assistance in respect of the work of coal and fuel controller. He has decided to try the new arrangement until Christmas.

TIP-UP BATHS.

The provision of a bath has now come to be regarded as an absolutely essential part of every dwelling house. In the larger type of residence this presents no serious problem, but in the planning of cottage property the reverse is often the case. In Darby's "Champion" tip-up bath architects would seem to have at their disposal an article which, if it

does not entirely remove their difficulties in this connection, renders comparatively easy at any rate the task of providing in their plans for an important aid to cleanliness. Some hundreds of builders and many thousands of users have had from eight to ten years' experience of Darby's baths, and, judging by the numerous testimonials which have reached the makers—the Patent Tip-Up Bath Co., 39 Broad-street, Birmingham—they are giving unqualified satisfaction wherever they are fixed. One well-known builder and contractor says: "In artisans' cottages I erected ten years ago I had over 500 of Darby's patent baths fitted in the sculleries in wood cabinets, and they look quite neat. As the properties have remained in my possession, I have thereby had personal experience; during the whole period I have not had any expense whatever with the baths, and they are in excellent order." It will be observed from the accompanying illustration that when tipped up the lower or foot end of the bath is sloped towards the outlet, thus ensuring perfect drainage. The makers, by the way, recommend that this part should be made in sheet copper (tinned on the inside) to provide against leaky taps doing any damage, and they quote an extra for this. The waste tube section is well riveted, and is consequently very strong and reliable. The baths are made of lead-coated sheet metal, and are supplied in sizes ranging between 4 ft. and 5 ft. 6 in. in length, and suitably enamelled.

HOUSING NOW AND AFTER THE WAR.

PUBLIC UTILITY SOCIETIES AND SUPPLEMENTARY ACTION.

Representatives of the Federation of British Industries of the labour side of the National Alliance of Employers and Employed and of labour generally, met in London on Tuesday to consider a housing scheme on broad lines in districts where the matter is urgent. The scheme, which was unanimously adopted, favours support of public utility societies and housing associations. It was agreed that the proper course is to form an addition, and not an alternative to municipal housing schemes. For example, Birmingham wants 20,000 houses, and the municipality will probably be able to supply 5,000, so that there is plenty of scope for supplementary action. The National Alliance of Employers and Employed is strongly in favour of supporting the public utility committees, and favours contribution in the form of loan stock, to do away with the system of tied houses, under which tenants occupy premises owned by their employers. It was felt that the scheme before the conference would enable small employers to combine in certain districts. The scheme contemplates having, if possible, on the committee of each public utility company representatives of the local trade unions, local employers, tenants, the municipalities, and social workers of the district in question. The scheme includes the provision of model houses, gardens, allotments and means of recreation. The financial side of the matter was fully discussed, and the hope was expressed that the Government would be at least as generous as under the old scheme, which provided for an advance of 75 per cent of the cost. The conference agreed to ask Mr. Hayes Fisher to receive a deputation before the Government housing scheme is definitely adopted.

Mr. H. Leete, county surveyor of Huntingdon, has submitted a proposition for the erection of seventy cottages for roadmen after the war.

Launceston Town Council Highways and Buildings Committee recommend a scheme for the erection of thirty working-class houses.

Athy Rural District Council propose to proceed with a second housing scheme for forty houses provided they can obtain a loan at 3½ per cent. Mr. Bergen, engineer, has been instructed to prepare a further scheme for 150 houses. The dwellings were stated to be required for the mining population.

Wellingborough Urban District Council have instructed the surveyor, Mr. E. Y. Harrison, to prepare estimates for the proposed working-class dwellings. It was explained by the chairman that before plans were finally selected it was intended that they should be on view to the public; in fact it was, he thought, desirable that their opinion upon them should be obtained.

FOR OTHER ADVERTISEMENTS
See End of Paper.

METROPOLITAN BOROUGH OF WOOLWICH.
PRIME COST CLERK.

The Borough Council invite applications for the appointment of Prime Cost Clerk in the Borough Engineer's Office. Preference will be given to those who have had experience in the offices of works departments or public works contractors. Salary, £2 10s. per week, plus a war advance of 10s.

Applications to be made to the Borough Engineer, Town Hall, Woolwich.

(By order)
ARTHUR B. BRYCESON,
Town Clerk.

(3,880)

Institution of Municipal and County Engineers.

MEETING AT BRIDGWATER.—(*Conclusion.*)

At the recent meeting of the Institution of Municipal and County Engineers, held at Bridgwater, a short discussion ensued upon the presentation by Mr. F. Parr, Assoc. M.Inst.C.E., the borough surveyor, of the paper—reproduced in part in our issue of last week—on

MUNICIPAL WORKS IN BRIDGWATER DURING THE PAST TWENTY-EIGHT YEARS.

Mr. H. T. Chapman (Kent) proposed a vote of thanks to Mr. Parr for his paper. He was pretty well acquainted with Bridgwater for six years, and at one time he was paid for criticising part of the work Mr. Parr carried out. At the same time Mr. Parr and himself were always the very best of friends and they got on very well together. Mr. Parr had very great difficulty in regard to the drainage of the roads in the borough. He was agreeably surprised to see how very greatly the roads had been improved since he left that part of the country. They would have noticed how narrow some of the streets in the borough were. Before the war Mr. Parr was considering some method of by-pass to ease the traffic, but he was afraid after the war the roads would require so much attention that there would not be much funds available for by-pass or through roads for Bridgwater and other similar towns. When he was in Somerset he was not in favour of the blue lias pavement, because it was exceedingly slippery. He thought the concrete slab paving was a great improvement.

Mr. J. Parker (Hereford) said the paper was of peculiar interest to him, for the reason that for seven years during the 'seventies and part of the 'eighties he occupied the position now held by Mr. Parr. He had the privilege of being associated in the installation of the waterworks with Messrs. Thos. and Chas. Hawksley. Soon after his appointment he found himself up against a very defective water supply, and during the first years of his appointment more notices were served for the closing of polluted wells under Sec. 62 of the Public Health Act of 1875 than had since that date been issued. In his own house he suspected the water and used carbolic acid in the drain nearest the well, with the result he anticipated, and shortly afterwards his next-door neighbour told him the water smelt and tasted of carbolic acid. He did not serve a notice upon himself, but had the defective drains put right, and after this the water was tolerable, but nothing like the quality of the present day. After much discussion, in and out of the town council, it was decided to call in Messrs. Thos. and Chas. Hawksley to advise. On several occasions he accompanied the late Thos. Hawksley in an examination of the many pure and copious streams flowing from the Quantock Hills some miles away, and after analysis and a systematic gauging of their various capacities two streams were intercepted at Ashford Hill, which after some local opposition were adopted for the supply and a loan granted for the construction of the works. The storage reservoir and sand filters were designed for a population and period of years now completed, and it would be for Mr. Parr and their medical officer to consider the best means of increasing the supply and keeping up to date the best means of filtration. On appointment to his present position he found the water supply at Hereford both inadequate and of doubtful purity. The council adopted his suggestions and increased both the pumping and filtering capacity. The latter was accompanied by the adoption of mechanical filters, Hereford being the first case in which a loan for the purpose was granted. As was usual with the Local Government Board, the inspector who held the inquiry regarded the innovation with some suspicion and turned down the scheme. He had at the time an enterprising chairman of the Waterworks Committee, and after an interview with the chief engineering inspector (it was before Mr. Boulnois's time) in London they succeeded in obtaining sanction to the loan, and erected the first set of mechanical filters ever applied by a municipal corporation. They had proved thoroughly reliable and arrested from 95 per cent to 98 per cent of bacteria and other matter in suspension, and so relieved the sand filters of a considerable amount of deposit, rendering the skimming of the beds less frequent, thus decreasing the cost of cleaning. The source of their supply was the river Wye, which was a much purer river than the Thames or the Severn, but not so pure as the mountain streams from the Quantock Hills. It often contained 4,000 organisms per cub. centimetre, a small portion being the bacillus coli communis. This seldom got beyond the mechanical filters. These filters were now in extensive use by water undertakings both at home and abroad. Indeed, in Shrewsbury four-fifths of the town water obtained from the Severn was dependent upon mechanical filters alone. Some such method for Bridgwater would, when the time arrived, be quite effective at a much smaller cost than the extensions of the sand filters.

Mr. D. Edwards (Taunton) remarked that county surveyors were pretty careful not to ask the cost of the roads, particularly main roads, per mile. He would like to ask Mr. Parr if he used a mechanical scarifier, and if so the cost per yard as compared with the work done by manual labour? He would also like to ask whether Mr. Parr had made application for that payment of the increased cost for hire of steam roller, having regard to the increased cost of coal and labour? Everything had gone up, and they must have an increased payment for what they lent to the county council. Mr. Parr referred to the painting of the roads with tar. Did he mean that he still continued the antiquated method of painting the roads by brushes? If so, he recommended him to go in for more modern methods. With regard to public improvements, he considered it absolutely wrong to carry out permanent works from current rate, thus allowing future generations to go scot free. They should borrow the money and spread its repayment over a number of years. With regard to paving, he admitted that blue lias was a little slippery, but he did not see why they should for that reason discard the local stone. The blue lias was cheaper to put down and it was durable. He noticed that the water consumption was from 35 gallons to 38 gallons per head for some years. That was enormous. A check was placed upon the consumption by the Deacon meter system, which reduced the consumption to about 22 gallons per head, and this was continued as long as the inspector was employed, but the consumption had since increased to 27 gallons per head. They were prepared to lose about 90,000 gallons of water per day of a value of about £770 per annum for the sake of an inspector at about £130 a year. Mr. Parr told them that the cost of filling in the recreation ground was £3,105. That charge ought to be put to the scavenging account, as it was the cost of dumping the town refuse there. They had got 50¼ acres of land for allotments. He would like to know what price they paid for the land; what size plots did they let to tenants: and did the tenants pay for fencing and other incidental work? Five acres of the recreation ground was used as war-time allotments. He should like to know if the council had made a charge for that; if they had they had no right to do so.

Mr. J. Siddalls (Tiverton) remarked that there was no surer test of progress than the gradual diminution of the death-rate. The figure of 17·03 given in the paper was exceedingly good for 1891, and reflected great credit upon the surveyors who had preceded Mr. Parr. He knew Tiverton was higher than that. It was now lower than the 13·9 to which Mr. Parr had brought the Bridgwater figure. He should like to know the cost of the highways and the main roads. They were able to estimate as they went over the roads, saw their width and the nature of the traffic, and whether it was concentrated or not, and the figure of cost would be very useful. Then would Mr. Parr tell them how he was treated as to the cost of scavenging, and how much they were allowed to put into repairs of the main roads? As to tar-painting, the figure was rather high. What proportion of that amount was paid by the county council? That was the thing they wanted to know in neighbouring counties.

Mr. L. D. Thompson (Cornwall) said the statistics formed a splendid introduction to the circumstances of the town. If he remembered rightly the rateable value of Bridgwater per head of the population was considerably higher than that of a colliery district in Lancashire where he was years ago—a rather extraordinary fact, because the workpeople in a colliery district were highly paid.

Mr. C. Pursey (Wales) said the question of borrowing for public works was a very important question and a very open one as to whether the present generation should not pay his own debts. He was opposed to any community borrowing small sums of money. Mr. Edwards had spoken of Mr. Parr's methods of tar-painting as inadequate. Until two years ago he did this work by a tar-spraying machine, but this year he had done it by hand labour, and it was as cheap. They could work at all times and they also had a much cleaner job. His county surveyor was very well pleased with the hand-painted work and preferred it to the machine work.

Mr. Edwards said he had never used a machine for tar-spraying, but had always used hand labour.

The President remarked that they had had a very good discussion on the paper. They got new ideas from these

discussions which were bound to be useful. With reference to tar-painting, he found he got better results from hand work than his neighbours did from machine work, and at less cost.

The members attending the meeting were afterwards entertained to tea by Mrs. Parr.

BARRY AND PENARTH MEETING PROGRAMME.

The programme of the meeting of the Institution of Municipal and County Engineers to be held at Barry and Penarth, to-day and to-morrow, the 27th and 28th inst., is as follows:—

To-day.

11.0 a.m.—Reception at Council Offices, Barry, by the chairman (Mr. George Wareham, J.P.) and members of the Barry Urban District Council. General business and discussion of the following paper by Mr. J. C. Pardoe, A.M.INST.C.E., engineer and surveyor, Barry: "Municipal Works in Barry during the past Thirty Years."

1.0 p.m.—Luncheon at the Barry Dock Hotel, by the kind invitation of the chairman and members of the Barry Urban District Council.

2.0 p.m.—Inspection of Barry Docks, by kind permission of Mr. T. H. Rendell, general manager, Barry Railway.

5.0 p.m.—Afternoon tea at the Marine Hotel, Barry Island, by kind invitation of Mrs. J. C. Pardoe, O.B.E.

To-morrow.

10.0 a.m.—Meet at Council Offices, Barry. Proceed to inspect works mentioned in the paper, including Barry Garden Suburb.

1.0 p.m.—Luncheon at Barry Dock Hotel at a charge of 2s. 6d. per head (optional).

2.0 p.m.—Proceed in brakes to Penarth. Inspect works at Penarth. Inspect Penarth Cement Works, by kind invitation of the management. Afternoon tea.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

ROADSIDE TIMBER.

To the Editor of The Surveyor.

Sir,—By the letters now appearing in the Press, public attention has been directed to the question of utilising the large quantities of roadside timber in the country as a possible source of fuel, in view of the coal shortage this winter. It is to be hoped that all local authorities, fuel committees, landowners and others concerned will take up this important question immediately.

There can be no doubt that along many of the roads in the country, particularly in rural districts, much useful timber for fuel purposes is lying ready for collection, and by careful examination I am certain that a far greater quantity could be got by cutting down all useless trees, &c., particularly where they or their overhanging boughs tend to obstruct the view for vehicular traffic at dangerous corners or bends in the road. The periodical cutting of roadside timber, trimming of hedges, &c., have been features in the programme of the Roads Improvement Association for many years, and in numerous instances the efforts made to secure improvements on the roads in these directions have invariably had good results.

If the question is only taken up seriously and at once by the recognised authorities, they would not only secure a large amount of timber for fuel, but at the same time effect a much-needed improvement in the roadways all over the country.—Yours, &c.,

James D. Haworth,
Acting Secretary, Roads Improvement Association.

15 Dartmouth-street, S.W.
September 23, 1918.

Doctors and Rural Roads.—The Pickering Rural Council on Monday received a deputation from the North Riding Health Insurance Committee respecting the repair of a road in the Rosedale district, which was said to be almost impassable. In consequence of this condition, the panel doctor (Dr. Kirk, of Pickering) had tendered his resignation as from the 30th instant, unless a definite promise was made to repair the road immediately. Without such promise the Rosedale district would be cut off from the services of a doctor, as two or three medical men had declined to take up the work. The chairman stated that the road had been cut up by the haulage of timber with a heavy engine, and the council had been negotiating with the responsible parties for months, but were now taking steps to repair the road themselves. They were trying to get German prisoners to do the manual labour, and he assured the deputation that the work would be pressed forward as speedily as possible.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

In connection with the necessity for food conservation is not the little pamphlet on the "Utilisation of Garbage," recently issued by the University of Wisconsin, a very useful guide to local authorities on the question of feeding pigs on the garbage found in house refuse? Is it not evident that the waste in our dustbins is still prodigious, and would it not be well if one of our very numerous Government departments were to issue small practical pamphlets on this and other similar subjects?

* * * *

Do we not all heartily wish success to the proposed new movement in Ireland for the promotion of an association, or union, to protect the interests of local government officials and to bring together these officials in such a manner as will be for their general protection, advancement and security? Is it not evident that the present tendency is to extend trades unions in other directions so as to protect the interests and well-being of professional men in the same manner as that which obtains with what are known as skilled trades?

* * * *

What is to become of the already rather numerous engineers, architects, and members of other professions who, having joined the army, are now being discharged? Have they not lost their connection with clients who have taken their work to men who have stayed at home, and are they not finding it very difficult to obtain employment? Will the "Silver Badge League" which is now in process of formation, with a view to protect discharged soldiers of all ranks, help them to reinstate themselves, or, at all events, find them something to engage them pending better times?

* * * *

When we come to the crucial point of putting reconstruction schemes in practice after the war, will it not be necessary to decide, among other difficult questions, whether the more general method of "lump sum" contracts, or payment to contractors of the prime cost of materials and labour plus a fixed percentage for their profit, is the best and most economical plan? Are there not a large number of questions to be considered before a definite decision can be arrived at as to the merits and disadvantages of both of these methods, and is it not possible that what is known as "direct administration" of the works by the engineer might be better than either of these methods?

* * * *

With reference to the numerous town-planning schemes which will have to be carried out after the war, would it not be a good thing if the Government could nominate and appoint town planners and engineers for the various districts in the same manner as has been done in the United States of America, where the Department of Labour has recently announced the names of the engineers, town planners and architects to design and carry out the various projects? Would not such action tend to allay any doubts as to who is to be called in to create similar works in this country and avoid any unseemly scrambling for such positions which may ensue without some such action?

* * * *

Could not the well-known saying of a learned professor that "dirt is only matter in the wrong place" be applied to house refuse? Paper, for instance, is not refuse except when placed in the dust-bin, and this also applies to cinders, tins, and a large proportion of valuable products that now unfortunately are thrown to waste, whereas they could, if conserved, be used over again with great advantage to the pecuniary position of the nation.

* * * *

Was there not an excellent letter in the August number of *Notes and Queries* from a Mr. Charles R. Moore, asking how it was that the Romans were able to align their roads in practically straight lines for sometimes hundreds of miles? Was it effected in the manner suggested by Mr. Moore—namely, by astronomical observation—or how was it done is what one would like to know?

"Safety First" Medals.—The London "Safety First" Council has instituted a Meritorious Service Award, consisting of a medal bearing the device of the council with red and green ribbon. This is to be presented in recognition of conspicuous acts of merit in connection with the prevention of accidents in the streets, in schools, workshops and factories, and by railway employees. With the badge is given a diploma and an honorarium. Applications for the award must be made to the council, 31 Westminster-broadway, with the names and addresses of witnesses. A poster showing by photographs the many ways in which street accidents can be avoided is also being exhibited on the hoardings.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. OCTOBER 4, 1918. No. 1,394.

Minutes of Proceedings.

Invalid By-laws (I.). The power of making by-laws is, in effect, a delegated power of legislation, and by-laws, *if valid*, are just as much a part of the law of the land as the Act of Parliament under which they are made. Therefore not even the authority which makes them can relieve any one from the obligation to obey them, *unless* there is a provision either in the by-laws themselves or in some statute, giving such authority a dispensing power or discretion (*Yabbicom* v. *King* [63 J.P., 149]). An instance of a statutory power of dispensation is to be found in Sec. 18 of the Ancient Muniments Consolidation and Amendment Act, 1913, which empowers borough and district councils, with the consent of the Local Government Board, to relax their by-laws so far as necessary to allow of the erection of buildings of a style of architecture in harmony with other buildings of artistic merit existing in the locality. In the case of *Salt* v. *Scott-Hall* (67 J.P., 306), Mr. Justice Channell expressed the opinion that *building* by-laws ought to contain a dispensing power; but we understand that it is not the practice of the Local Government Board to confirm by-laws which contain such a power. In order to constitute a *valid* by-law there are four indispensable requirements, two of a negative and two of a positive character. In the first place it must not impose restrictions or duties not authorised by the statute under which it purports to be made. Therefore a by-law requiring occupiers to remove snow from the footpath, purporting to be made under Sec. 55 of the old Public Health Act of 1848, was held to be *ultra vires*, because that section only authorised by-laws with respect to the removal of "dust, ashes, rubbish, filth, manure, dung and soil." (*R.* v. *Wood* [5 El. and Bl. 49]). Secondly, a by-law must not be repugnant to the laws of England. It is expressly provided by Sec. 182 of the Public Health Act, 1875, that no by-law made under that Act shall be of any effect if repugnant to the laws of England, or to the provisions of the Act. The meaning of the expression "repugnant" was explained by Mr. Justice Channell in *Gentel* v. *Rapps* (1902; 1 K.B., 160) as follows: "A by-law is not repugnant to the general law merely because it creates a new offence, and says that something shall be unlawful which the general law does not say shall be unlawful. It is repugnant if it makes unlawful that which the general law says is lawful. It is repugnant if it expressly or by necessary implication proposes to alter the general law of the land." On this principle a by-law providing that no person should in any street or public place, or on land adjacent thereto, "sing or recite any profane or obscene song or ballad, or use any profane or obscene language," was condemned, on the ground that the Town Police Clauses Act, 1847, creates a similar offence, but with a proviso that there must be annoyance to residents or passengers, and that there was no such proviso in the by-law. (*Strickland* v. *Hayes* [60 J.P., 164]). Thirdly, a by-law must be certain and positive in its terms. Therefore a by-law that no person should "annoy" passengers in the streets was held to be invalid for "uncertainty," on the ground that there were other by-laws dealing with specific nuisances, and that this particular by-law did not give adequate information of what it intended to prohibit. (*Kruse* v. *Johnson* [62 J.P., 469]). Fourthly, a by-law must be reasonable, and the chief interest of the last mentioned case lies in the following observations of Lord Russell as to the test of reasonableness or unreasonableness in a by-law. "I do not mean to say that there may not be cases in which it would be the duty of the court to condemn by-laws . . . as invalid because unreasonable. But unreasonable in what sense? If, for instance, they were found to be partial and unequal in their operation as between different classes, if they were manifestly unjust, if they disclosed bad faith, if they involved such oppressive or gratuitous interference with the rights of those subject to them as could find no justification in the minds of reasonable men, the court might well say Parliament never intended to give authority to make such rules; they are unreasonable and *ultra vires*. But it is in this sense, and in this sense only as I conceive, that the question of reasonableness can properly be regarded; a by-law is not unreasonable merely because particular judges may think it goes further than is prudent, or necessary, or convenient, or because it is not accompanied by a qualification or an exception which some judges think ought to be there."

* * * *

A Road-Tarring Case. The responsibility of a public authority for an alleged act of omission received a further development at Widnes recently, where the town council were sued for damage to a governess car due to its passing over a newly-tarred road. The case for the plaintiff was that the car was covered with tar and chippings, and was not presentable to drive, and the contention was that the corporation were negligent in that they had not exercised reasonable care in covering the road with sufficient chippings. The defence was that every care had been exercised in doing the work. On March 26th it began to rain, and operations were suspended. The road, it was urged, had been properly covered with chippings, but the rain had not allowed the chippings to set. The road foreman, answering Judge Shand, the county court judge, stated that the road was not blocked off to warn people because it had never been found necessary to do this. Judgment was given for £10, and thus a new embarrassment has been added to the many others incurred by the highway authority. We do not know whether steps will be taken to appeal against the judgment, but it certainly seems as if it ought to come under judicial revision, for while the town council were rightfully performing their legal duty it does not appear that they did this in an improper manner. It was argued for the corporation that if the plaintiff succeeded public authorities would be placed in an awkward position, as "everybody would be sending in claims." The answer of the judge to this plea was, "All you have to do is to warn them." The decision obviously opens up a wide field for speculation, and more should certainly be heard of it.

* * * *

Housing Registries. It is well known among housing experts that the serious shortage of dwellings for the working classes which exists is not peculiar to this country, but is common to all the European belligerents. Before the war the standard of housing in Germany was generally lower than that in Great Britain, and special steps have had to be taken there, as here, to deal with the further lack of accommodation which has arisen as a result of the prolongation of hostilities. It appears from the last issue of the Board of Trade *Labour Gazette* that among the devices adopted in Germany has been the establishment of "housing registries" by several municipalities. Experience has shown that these registries are only really useful where the information they collect is exhaustive—that is to say, where there is imposed on house owners a legal obligation of notifying the fact that they have vacant accommodation, and of reporting when their houses are let. While it is evident that the establishment of such registries does not in any way deal effectively with the real housing problem, they have at least served the purpose of securing that such accommodation as there is is turned to the best advantage. Hitherto they have not been popular with house owners, but in view of their proved usefulness, the Prussian Legislature have recently passed a law making their establishment compulsory in all towns with more than 10,000 inhabitants. It is at least worth considering whether the idea might not with advantage be applied to this country as a means of relieving the housing situation pending the inauguration of the Government building scheme.

National Kitchens. In order to ensure the success of the Government housing scheme, special committees have been set up to make recommendations with regard to various matters of detail. The fact that the home is the sphere of women's labour has been recognised by the appointment of Women's Committees to suggest improvements in the domestic arrangements of working-class dwellings, particularly with a view to the saving of work; and in this connection it is suggested in an article by Mr. W. E. Whyte, which will be found in the next column, that new housing schemes should include co-operative kitchens. There is no logical reason, after all, why the proved economy of central cooking arrangements should not be applied in peace time as well as in war; and we venture to think that if co-operative kitchens are provided in connection with the Government housing schemes, as Mr. Whyte suggests, the innovation will be a very popular one. Experience has shown that these institutions can be run at a considerable profit, although very moderate charges are made for food which has been purchased at war prices, and it would appear that even larger profits would accrue under more normal conditions. This means that the central kitchen could be run for the benefit of the district in which it is situated, the available profits being used for the improvement and embellishment of the neighbourhood or for some other useful local purpose.

* * * *

Sewerage and Typhoid. One of the more common causes of an epidemic of typhoid is well known to be the contamination by sewerage of the public water supply. The general recognition of this fact has perhaps diverted attention from the question of the *direct* influence on typhoid fever death rates of the use of insanitary and inadequate methods of sewerage and excrement disposal. This important subject has, however, been recently investigated by the New York State Board of Health, who have compiled statistics over a period of twenty years, comparing the typhoid death rates of a number of towns with and without proper sewerage systems respectively. In selecting the towns for comparison, every effort was made to choose those in which other typhoid causes would not obscure or overshadow the one under investigation; and the result is certainly striking. The average of all the rates for the twenty years is 17·7 per hundred thousand for those towns with sewers, while for those without sewers the corresponding figure is 22·3—that is, about 26 per cent higher. Moreover, the report expresses the belief that if due allowances could be made for the effect of other conditions, such as milk and water, a considerably better showing could be made for the sewered towns, since the greatest differences in death rates were found between sewered and unsewered cities where the comparison was to some extent affected by such conditions.

THE LAW AFFECTING PUBLIC HIGHWAYS.

The council of the Institution of Municipal and County Engineers have under consideration what alterations in the laws affecting public highways are desirable in the following matters:—

(*a*) In the powers and conditions under which highways may be interfered with by statutory companies and others for the purpose of laying mains, cables, drains, &c., and in regard to subsequent reinstatement.

(*b*) In respect of the rights and powers of the "adjoining owner" in public highways.

(*c*) In respect of the compulsory acquirement of land for the purposes of new highways and for widening and improving existing highways.

(*d*) In respect of the powers to lay down or define a building line on public highways.

As many towns in the country have special Acts or by-laws affecting such matters, which might be of use to the council in their deliberations, members in those districts possessing such special Acts or by-laws are requested to forward copies as soon as possible to Mr. A. Dryland, County Hall, Kingston-on-Thames.

The Provision of Dustbins.—Barnstaple Town Council have referred to the Sanitary Committee a letter received from the Local Government Board on the question of the provision of sanitary dustbins. It appeared that the Barnstaple and District Trades and Labour Council wrote to the board inquiring whether they would be within their rights in requesting the town council to compel landlords to supply each house with a sanitary dustbin, and if so what was the best course to adopt. The Local Government Board had replied that it could not undertake to give advice on the matter, and had forwarded a copy of the letter to the town council. The board pointed out the difficulties of manufacture owing to war requirements, and that supplies of metal dustbins are very limited.

HOUSES OF THE FUTURE.

A PLEA FOR NATIONAL KITCHENS.

By W. E. Whyte,
District Clerk and Treasurer for Hamilton, and Divisional Director for Scotland of the National Kitchens Division.

The movement for the establishment of national kitchens is steadily gaining ground, and while the war essentially was, and has been, the immediate consideration in the minds of local authorities and the public in approaching the question, a broader conception of what this feature of communal work may accomplish is rapidly spreading throughout the country.

The saving of food—or rather the avoidance of waste—the saving of labour, the supply of wholesome, well-cooked food, and the limitation of charges, while they are all of outstanding importance in war time, are equally important and they are equally called for at *all* times. All parties and all classes seem to be agreed that in the schemes of social reconstruction to be undertaken after the war, housing, public health, industrial welfare must be dealt with on a comprehensive and extensive basis.

Special Governmental Committees have been set up to consider particular features of the new housing schemes to be launched, their field of enquiry embracing questions connected with types of houses, materials to be used, lay-out, &c., and Women's Committees have been appointed to suggest ways and means for improving the working arrangements in working-class houses and the saving of labour. Probably in no better way than in the establishment of national kitchens can labour in connection with the household be saved. Not only so, but fuel can be economised, smoke minimised, and good, wholesome food supplied at prices which will favourably compare with the average household expenditure in this connection. The immensity of the housing question suggests that there is here a field for the national kitchen which as yet has not been dreamt of. England and Wales require some 500,000 new houses after the war; Scotland requires probably 200,000.

THE LOCAL AUTHORITIES.

The agency to be used in the provision of these houses is to be the local authorities, or at all events they are to be the principal agency. The new schemes are to be formulated on town-planning principles; the old ideas are to be scrapped and model colonies and villages, well spread out on the land, and with lots of open space, are to be the features of the house building of the future. Why should not these new schemes include the national kitchen as an integral part of their conception? Of a certainty such provision would be enthusiastically welcomed by the housewife, and who is more entitled to be considered in connection with the working arrangements of a house?

The possibilities of the introduction of kitchens cannot be gauged. They will, as already indicated, save labour and make for economy; they will be the means of avoiding waste, and in many other ways they will add to the attractiveness and utility of the new housing schemes. They will do more; they can be the medium for improving the health of the people by supplying them with wholesome well-cooked food, and they can be the means of educating the people in cookery. Training in cookery and domestic science can be undertaken at the national kitchen, and in a hundred ways the kitchen may be a boon to the district or village which it serves. It could be run also for the benefit of the district or village—any profits being available for the improvement and embellishment of the village, or for some other useful local purpose. The management might be entrusted to a local committee, and in this way local interest would be obtained and close supervision and direction ensured.

It is for consideration whether the Government should not advise local authorities to take into consideration in the formulation of their new housing schemes the inclusion of a national kitchen. If the Government are to contribute part of the cost of the schemes, they should require local authorities to have due regard to the great benefits which not only the citizens, but the nation, may secure by means of a well-ordered arrangement for supplying proper and wholesome food for the people. The national kitchen can fulfil this desideration, and will unquestionably do much towards making for success in any model scheme of housing that may be undertaken "in the days after the war."

Institution of Mechanical Engineers.—To-day (Friday), at 6 p.m., the Thomas Hawksley lecture on "The Experimental Study of the Mechanical Properties of Materials," by Dr. W. Cawthorne Unwin, F.R.S., past-president, will be delivered in the meeting hall of the Institution of Civil Engineers, Great George-street, Westminster, S.W.

Tar Macadam *v.* Tarred Slag.

By W. JENKINSON.

[From a Paper read at a Meeting of the Quarry Managers' Association held at Chester.]

That county surveyors are likely to substitute bituminous roads in place of the ordinary macadam roads, particularly where the traffic is heavy, is no surprise. The tendency to do this has been apparent to us all. The reason for this we know, and need not go into. We can take it as an absolute certainty that whenever circumstances permit our county roads are to be composed of bituminous material; the demand for ordinary macadam is to be on the decrease, and the wise quarry master will prepare in advance for this.

With this tendency alone we need not be gravely concerned, if the decrease in the demand for macadam meant a proportionate increase in the demand for tarred granite and limestone, but the reason for the praise being meted out to tarred slag in preference to tarred stone requires consideration. County surveyors have no bias in favour of slag. If, say, tarred granite gave better and more economical results than tarred slag, they would quite readily say so, and prefer the former. But that many surveyors have proved through experiment that slag is more satisfactory than granite for tarred roads requires some explanation. That a large number of surveyors, on the other hand, swear by tarred granite does not prove that those in favour of slag are either mistaken in their opinion or biassed against granite. What it seems to prove is that, while some surveyors have been fortunate in their choice of tarred macadam, others have been the reverse. Of course, the same might be said of slag, but I do not think it would be correct. All slags are pretty much alike, but there are great differences in granites; and the granite which makes the best macadam in many cases makes the most unsatisfactory tarred macadam. And there have also been great differences in the making of the tarred macadam at different quarries.

QUALITIES OF GRANITE.

Granite (I use the word in its wider sense—commercial granite) may be divided into two sections—course grained and fine grained. The former makes the most satisfactory tarred macadam. Pure granite makes good tarred macadam. On the other hand, very close grained hard granite does not lend itself to tarring. For instance, basalt, while excellent for macadam, is not suitable for tarred macadam.

Pure granite (geologically pure) and sienite make the most satisfactory tarred macadam; while on the other hand pure granite does not make the most satisfactory ordinary macadam. The reason is this. In general, granite—that is pure granite—has a lower crushing strain than basalt, Plutonic rock of granite porphyry. Pure granite and sienite are more loosely grained, their component parts have not fused together to the same intensity as the other stones. The consequence is that the heat used in drying the stone can penetrate further into them, and the tar also can penetrate further into them, and, the grain being rougher, will stay there under the movement of the road through traffic.

On the other hand, the other class of stone is affected in treatment *vice versâ*. Being hard and compact, the heat and the tar in particular do not penetrate, and the binder simply forms a thin coating which very soon wears off, and explains the cause in cases where tarred macadam which on being lifted has been found destitute of tar.

I do not say that pure granites and sienite only are suitable for this class of material, of course. I have simply illustrated extreme cases as a guide to those interested in the subject. It can be taken for granted, however, that the coarser the grain of the stone the better suited it is for making tarred macadam. And it can also be taken for granted that close-grained, extremely hard stone is unsuited for the purpose.

MANUFACTURE OF TARRED MACADAM.

To insure the prosperity of the quarries we have to give satisfaction. Any old stone dipped in tar in any old way as long as it is black is not tarred macadam, and is not only damaging the reputation of the manufacturer, but is also doing irreparable damage to the trade in general. That the demand may be greater than the output is no excuse for selling rubbish. In slag we have a competitor of repute, handled by big concerns out to do business, and it will take very careful handling to regain the ground we have already lost through, I sincerely believe, carelessness. Admitting that tarring macadam has been a new branch of the quarry trade, there should be no excuse in the future for committing the errors which have already been made.

Care, great care, is absolutely necessary to make a satisfactory tarred macadam. Given the right quality of stone for the purpose—and some granites are absolutely of no use for the purpose—a bituminous material can be made which will beat any slag on the market. The fact that there are surveyors of repute who swear by tarred macadam is sufficient proof of this. They have used proper tarred macadam. The others have not been so fortunate.

A proper tar binder is essential. One of the proven tar binders on the market is what is required. You cannot improve or equal these by making your own binder. A proper mixer and the proper temperature, careful handling throughout the process—these are the necessities.

The makers of tarred slag are to the front in advertising their wares. It does some good to let people know you have confidence in your product. Perhaps the quarry owners will not give the tarred slag makers all their own way in this respect, but, following their example, and having a good article, will "blow their own trumpets" a bit.

MOTORS AND MUNICIPAL WORK.

GAS TRACTION.

In the course of his presidential address recently to the North of England Gas Managers' Association, Mr. Norman S. Cox, of Sunderland, remarked that the use of gas as a power agent for traction purposes was steadily increasing, and that when war conditions permitted of the manufacture and supply of compressing plant and cylinders the use of gas-propelled vehicles might be greatly extended. A 20-h.p. "Studebaker" van used in connection with the clearing of slot meters—one of the earliest cars fitted with a flexible container and holding 250 cub. ft. of gas—covered a distance of 11 miles (equivalent to approximately a gallon of petrol) and had given every satisfaction. Two coke delivery wagons had also been adapted. It was very necessary to have suitable appliances for keeping the bag in position when deflating; otherwise it flew out and might catch obstructions, which might be fraught with serious results.

They had a small experimental plant comprising a two-stage vertical compressor with piston displacement of 15 cub. ft. per minute, which would compress gas to 1,200 lb. per sq. in. when running at 400 revolutions per minute, and a 7-in. diameter water separator. A 10-b.h.p. two-seater "Humber" had been running on coal-gas compressed to 1,200 lb. The steel cylinder, 3 ft. 4 in. long by 8 in. outside diameter, with a capacity of 84 cub. ft., carried at the back, weighs 98 lb. The gas passes through $\frac{3}{16}$ in. inside and $\frac{5}{16}$ in. outside diameter copper tube to a reducing valve, pressure gauge, and suction chamber, weighing 14 lb., where the gas is filtered, and the pressure reduced to a few tenths of an inch, and from there to a special carburetter. The car started easily, ran smoothly, and would cover 8 miles on one charge. At present, however, a reduction in the power (particularly on the hills) was noticeable. As it was only used for supervision work in their own area of supply, and could be switched on to petrol if necessary at any time, the difficulties of filling stations did not apply. However, for the future it would be necessary to build specially adapted vehicles, and to standardise cylinders and connections to enable users to have them quickly charged at the appointed stations at any town or village on the main routes, or, better still, in the case of detachable cylinders, to change the empties for full ones.

Uxbridge Urban District Council have received the sanction of the Local Government Board to a loan of £1,100 for the purchase of a motor fire engine.

Hayes Urban District Council are seeking the sanction of the Local Government Board for a loan of £1,500 for the purchase of a motor fire engine and accessories.

Special Fire Brigade Areas.—The recent constitution of the North-Eastern District as a special fire brigade area has now been followed by an Order of the Home Secretary constituting a South-Western area, consisting of the counties of Wilts and Gloucester, and portions of the counties of Somerset, Berks, Worcester, Hants, and Monmouth.

The Labour Companies.—We have only to consult the daily casualty lists to see (says *Truth*) how heavy a toll is paid by Labour officers and men in all theatres of war. The Labour companies work in the open without artificial protection and under conditions which, unless an attack is in progress, are far less "cushy" than those of the men in the trenches.

Institution of Municipal and County Engineers.

MEETING AT MIDDLESBROUGH.

Mr. T. W. A. Hayward, the president, occupied the chair at the meeting of the Institution of Municipal and County Engineers held in the North-eastern district at Middlesbrough on Friday and Saturday, the 20th and the 21st ult. The attendance included Messrs. F. W. Spurr, district chairman, S. E. Burgess (Middlesbrough), D. H. Brown (Durham City), T. J. Trowsdale (Annfield Plain), F. W. Eviven (Easington), G. H. Whitaker (Sunderland), Leonard Leeper (Blyth), F. P. Frank, Capt. (Stockton), B. Wormleighton (Loftus), Frank Massie (Wakefield Rural), J. P. Spencer (North Shields), W. Fowlds (Rugeley), W. Burton (Wakefield), E. J. Silcock (Leeds and Westminster), Geo. Mitchell (Stockton), T. C. Beaumont (Driffield), Ernest J. Miles (West Hartlepool), J. P. Wakeford (Wakefield), C. C. Rivers (Harrogate), Chas. W. Hall (Felling) and W. H. S. Dawson (Bradford).

The Mayor of Middlesbrough (Councillor Jos. Calvert, J.P.) presided at the opening of the gathering, and extended a hearty welcome to the members. His Worship said it was essential that not only in the engineers to public authorities, but in all the officials, they should seek to have the very best men. He believed that in Middlesbrough they have one of the best members of the institution in their borough engineer, Mr. Burgess. They all honoured him, and were very much perturbed a little while ago when there was some slight possibility of his being taken from them.

As they made their inspection of the various objects Mr. Burgess had to show them they would see that in many respects they had made considerable progress. But they were never much concerned to look backwards. Their look was always a forward look, and they were looking forward with great expectation to seeing, after the war was over, a greatly improved town, and they would need all the skill of one of the institution's members in piloting it to the desired haven.

The President, in acknowledgment, said they were glad to come to Middlesbrough as an institution, because they liked to visit towns that were progressing, towns that had done work they could emulate.

The chair was afterwards taken by the president, and the meeting proceeded to the consideration of a paper by Mr. Burgess—reproduced in our last issue—entitled

PUBLIC WORKS AT MIDDLESBROUGH.

In some introductory remarks, in which he expressed gratification at the institution's visit, Mr. Burgess said he should like to express his appreciation of the staff he had to help him in carrying out the work in Middlesbrough. Five members were serving with the Forces. Two had been badly wounded—one was in hospital at Roehampton, and another was Captain Ellen, R.E., M.C., a pupil and assistant of his, who had had the misfortune to lose his right leg. He should like to introduce him to the meeting. He hoped he would continue his studies, and go forward in the profession and make a successful municipal engineer.

Mr. Spurr, in proposing a vote of thanks, said he saw Mr. Burgess put down the average cost of maintenance for paving at £32 per mile. He presumed that in wood paving he did not provide for replacing. (Mr. Burgess: It does not include renewals.) In pumping, too, Mr. Burgess might give much more information. It would be useful if he could give the average head of lift, the price of electricity, and the cost of pumping per 1,000,000 gallons. Then, with regard to the cost of the making up of private streets, it was interesting to note that Middlesbrough insisted on streets being made up with paving on concrete foundation. If he were to suggest that at York he did not know what they would do with him. The best he could get was tar macadam, and then they thought he was extravagant.

Mr. Wakeford, seconding the vote of thanks, said he had some electrically-driven pumps, and up to the present they had not carried out the guarantee given in regard to them. They might be told what was the combined efficiency of each of the pumping plants—water horse-power for electric horse-power. Then in regard to the calculated requirements of the outfall sewers of the district, he observed that a rainfall of one-third inch per hour had been allowed for, but the precise figure to be adopted as a basis for the engineer's calculations appeared to remain a matter on which there was still considerable divergence of opinion, notwithstanding the many able papers on the subject by men of wide experience and observation; and perhaps it would be within the mark to say that the difference of opinion among engineers might result in calculations based on figures ranging from ¼ in. to ½ in. rainfall per hour. In the older text-books it had been somewhat vaguely stated that when sewers were constructed to carry off storm water, they should have a capactiy to discharge a proportion of a 4-in. rainfall in twenty-four hours, varying according to the character of the district. Among more recent contributions on the subject he felt sure that the engineering profession was greatly indebted to the late Mr. T. de Courcy Meade, for his most valuable paper entitled "A Few Notes on Twenty Years' Work in a Great City," read at an institution meeting at Manchester in February, 1914. The tables and diagrams accompanying that paper contained a vast amount of useful information, and special note might be made of the diagram giving the ratio of impermeable area on the basis of population per acre. With the help of this diagram the requirements in respect of storm water of any given drainage area of which the population had been ascertained or estimated might be calculated by two methods—viz.: (1) The preportion of impermeable area corresponding with the given population rate might be taken unclassified and a maximum rainfall and rate of flow-off per hour assumed without reference to the various surfaces of which such area might be made up. Personally he had adopted this method, assuming a maximum rainfall of ⅓ in, and a flow-off rate of two-thirds of this amount within one hour, also in some cases allowing, say, ·02 in. per hour as representing the estimated flow from such portions of the permeable area as the contour of the ground and other circumstances might appear to require. (2) In the second and possibly more accurate method the impermeable area had been sub-divided into roof surfaces, street and passage areas, yards, footpaths, &c. All these were shown on the diagram in their proportional relation to the rate of population per acre, and in the sewer calculations provision might be made in accordance with the following figures: Roofs (horizontal measure), ·5 in. per hour; flagged surfaces, ·2 in. per hour; paved surfaces, ·1 in. per hour. If necessary a further allowance might be made for the estimated flow-off from the whole or portions of the permeable surface (if any) at rates varying between ·01 in. to ·05 in. per hour, according to the nature of the ground. The subject, however, of provision for storm water in sewers was one of such complexity that no set of tables or diagrams on any basis yet devised could be made strictly applicable to all conditions, and in considering those referred to there might be special circumstances in which their use would be inadmissible. Take, for example, the case of any large manufacturing town in which there might be considerable districts, chiefly of an industrial character, closely built up with large works, factories, warehouses or other business premises, with a few scattered dwelling houses of the working-class type. Here they would have an area practically altogether impermeable, including a high percentage of roof surface, but with a low rate of population per acre. In this instance any deductions made from information contained on the diagram in question would be wholly misleading, and results calculated on the population basis inaccurate. On the other hand, of course, it might be urged that industrial buildings being usually situate fronting or adjacent to rivers or waterways, a large proportion of the rainfall would probably be diverted from the sewers into the watercourses. Other instances might occur to one's mind in which the rate of population basis would be inapplicable, such as areas comprising extensive parks, pleasure grounds and the like, usually laid out with impervious promenades, roads and footpaths properly drained, in addition to certain buildings not of a habitable kind, and therefore, having no resident population, a reference to the diagram would be useless. These remarks, however, were meant in no way to detract from the general usefulness of Mr. Meade's diagram, and after a perusal of the tables on which it had been based members would appreciate the amount of labour involved in preparing the valuable information he had placed at their disposal.

Captain Frank, referring to the question of the rainfall to be allowed for, said it might be of interest to the members present to know of a certain maximum rainfall that occurred in July, 1904, at Huddersfield. The point he remembered about it was that the fall for three hours was more than three inches. A certain sewer was actually blown up, and it looked as though a series of shells had fallen on the road. Mr. Burgess said he hoped to put in fourteen houses to the acre. He (the speaker) was wondering whether he would be able to do that and get a portion of the grant from the Local Government Board.

Mr. Dawson said he would venture to suggest that Mr. Burgess should look a little bit further ahead, and that if his new road were 100 or 120 ft. wide, instead of 80 ft., he would be providing for the future in a way that was probably little thought of. As regarded the point as to how rain water got into the sewers, he suggested that it all depended on circumstances. The rainfall in some districts was considerably heavier than it was in a district like Middlesbrough. If he

had to make provision for sewers in Middlesbrough and went on the lines of Bradford, where the altitude was anything from 240 ft. to 1,100 ft., he would be hopelessly flooded. And so in many other cases. These were all things which are bound to be calculated by work, experience, records and data of the particular district to be dealt with.

Mr. Silcock said he was very glad to hear from Mr. Burgess that the town had adopted a town-planning scheme, and that it was proposed to limit the number of houses per acre in the future. When they looked at the map they could see it was necessary, and they were told in the paper that Middlesbrough had houses at the rate of forty and more to the acre. Even in Leeds, where they had back-to-back houses, they did not put them up forty to the acre. Middlesbrough must have been rather short-sighted in this matter.

Mr. Dawson drew attention to the following paragraph in Mr. Burgess' paper: "The estimated cost, pre-war figure (of the new garden colony housing scheme), is £30,000. Interest and redemption and working expenses at pre-war figures were just about balanced by the rentals, and the scheme was planned and arranged so that no loss in the working of the same would accrue to the corporation." He thought he was right in suggesting that the £30,000 would have at least grown to £60,000. (Mr. Burgess: Quite so.) Mr. Dawson: How was it proposed to make up the deficiency? If it was an economical scheme at £30,000, it could not be at £60,000. That raises a point which was of very great interest to the authorities who were dealing with housing schemes in all centres. Some people thought that the municipality should bear the cost, but other people, going on sounder lines, maintained that working people should be paid such a wage as would enable them to keep their families and pay an economic rent. Why should he, who lived in his own house, help to pay for Mr. Jones' house? In that way the thrifty were subsidising the unthrifty. Then there was another point. Why should the Local Government Board continually insist that if one bought land for reservoirs or the erection of working-men's dwellings, one should pay back the loan in fifty or sixty years? The land would not run away.

The discussion was then closed, Mr. Burgess promising to reply in due course to the various matters brought to his notice.

VISITS.

An interesting programme of visits was carried out on the following day. At the outset the Middlesbrough transporter bridge, erected at a cost of £87,000, was inspected under the guidance of Mr. Burgess. The members afterwards proceeded to the works of Messrs. Tarmac Limited, at the Ackland Steel Works, the process of manufacture, testing and other technical details being fully explained by representatives of the company.

BARRY AND PENARTH MEETING.

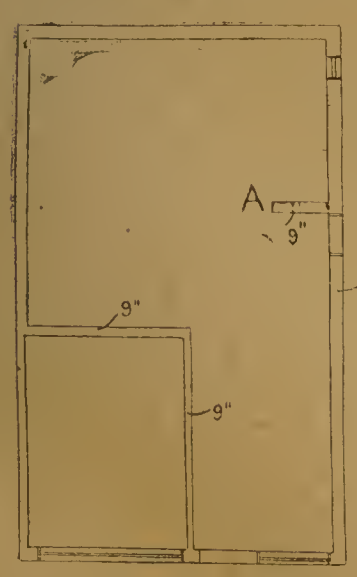
A report of the meeting of the Institution of Municipal and County Engineers held at Barry and Penarth on Friday and Saturday last will appear in our next issue.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

By-laws: Cross Wall.—"W. J. G." writes: In the accompanying plan submitted to my council the wall marked "A" is held to be a "cross wall" for the purpose of determining the length of the external wall in accordance with by-law No. 19 (iii.). When a cross wall has been bonded into another wall of sufficient thickness at each end it has been passed as complying with the by-laws; an example is shown at the bottom left-hand corner of the plan. There is a doubt, however, as to whether the wall marked "A" is a cross wall within the meaning of the by-laws, seeing that it neither goes across the building, nor is it bonded into a return wall at one end, and it is easily conceivable that such a wall might be so short as not to be of any support to the external wall—in fact, it might become nothing more than a pier. A "cross wall" is a return wall, and by-law No. 19 (iii.) seems clearly to indicate, where underlined, that it shall end in another return wall at each end, as the length is to be measured from the "centre of one return wall to the centre of another." Is "A" a cross wall?



The by-laws contain no definition of a "cross wall"; but by-law 19 (iii.) is almost identical with clause 8 of the First Schedule to the London Building Act, 1894, and in sec. 15 of that Act "cross wall" is defined as a "wall used, or constructed to be used, in any part of its height, as an inner wall of a building for separation of one part from another part of the building, that building being wholly in, or being constructed or adapted to be wholly in, one occupation." In my opinion the expression "cross wall" would be interpreted in the same sense for the purpose of the by-laws, and therefore I do not think that "A" is a cross wall.

Projection from Building over Footpath: Bay Window.—"W. H. F." writes: A person has purchased a house lately occupied and used as a butcher's shop, the front of which was square with the footpath, but over the shop window was hung a canopy about 9 ft. from the ground, extending over the path 2 ft. 6 in. There were also two steps, one for the shop door and one for the private door, which stood out in the path about 18 in. The person in question wishes to build a bay window to project into the path about 2 ft., contending that the land occupied by the steps, and over which the canopy hangs, is a private forecourt. Can he claim this right?

Assuming that the road is a public highway, and that the bay window would interfere with the safe and convenient passage of the public along the footpath, it would, in my opinion, be unlawful.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is not a very strong sidelight thrown on the power of militarism in Germany when we read that Mr. W. Jervis, the county surveyor of East Suffolk, stated that the German prisoners at work on the roads "seemed to treat a civilian as having no authority at all"? Would it not be well, where these prisoners are employed, to clothe the English ganger in some description of uniform in order to impress these prisoners with his importance? After all, is there not something in the saying that "Clothes make the man"?

* * * *

How is it that the municipal authorities of Shanghai and Hankow are enjoying the services of an eminent chemist and not an engineer to advise them on their sewage disposal schemes? Will not sanitary engineers in this country and abroad have to look to their laurels if chemists are to take their place in designing and carrying out sewerage and sewage disposal works?

* * * *

As the scavengers employed by the Blaenavon Urban District Council have recently had their wages raised to £3 a week, would it not be interesting to ascertain how many surveyors to local authorities in this country are receiving "salaries" of less than this amount? Is it not a fact that a very large number of rural and small urban authorities are paying their surveyors £150 a year or even less? When shall we learn that brain power is of equal value to mere manual labour?

* * * *

Is it not rather depressing to find how little credit is given to the road surveyors and their staffs for all that they have done towards keeping our roads passable during the strenuous times of the last four years? Do the general public, or even members of local authorities, realise what the work has meant with depleted staffs, paucity of materials, restricted and more expensive labour, and many other difficulties? Is there not a tendency to belittle the value of road work? But would not a little reflection show that our highways are a national asset and that without good roads everything would cost more to transport and the whole trade of the country would become sadly disorganised?

* * * *

Have the recent American laboratory experiments into the resistance to wear of concrete been of much value? Have the following condensed conclusions, deduced from the tests applied, anything specially novel in them?—"Crushed stone is better than gravel; large sized stone and gravel are more durable than small; resistance to impact depends on the quality of the mortar and aggregate employed; coarse gravel sand mortar resists impact better than that made with fine sand; and, finally, no relation has been observed between compressive strength and resistance to impact." Were not most of these deductions well known by experience, and are not such conclusions rather elementary?

* * * *

Was there not a good deal of sound common sense in the letter in the *Times* of September 11th from Mr. F. Dawtrey Drewitt with reference to the misplaced position of many of our roadside trees and advocating their removal as timber to be used for trade purposes? When we see so many trees not only damaging our roads, but also obstructing the light and air from the windows of dwelling houses, is it not remarkable that such obstructions should be allowed to remain when the country is crying out for more wood?

Maintenance of Roads in Rural Areas.*

By JAMES A. WEBB, Engineer and Surveyor to the Hendon Rural District Council.

[*Concluded from last week.*]

With the object of obtaining the opinions of those members who have had considerable experience in the use of refuse destructor clinker in the maintenance of highways, these notes were submitted to the borough engineers of Worthing and East Ham, and the engineer and surveyor of the urban district of Isleworth, and the author has great pleasure in expressing his thanks to each for the following replies:—

Mr. Roberts, borough engineer of Worthing, stated that he had read the notes on tarred clinker, and could only say that the first road he laid—thirteen years ago—is quite good to-day. He has two roads in the centre of the town surfaced with tarred destructor clinker which are narrow, and through which all traffic from Brighton enters Worthing in addition to the local omnibus traffic of fifteen minutes' service. These roads were put down some nine years ago with excellent results, proving that success has been achieved in urban roads in addition to roads in rural or outlying districts. Owing to the difficulty of obtaining granite chippings last year, crushed destructor clinker was used when tar-spraying, which made a fairly good surface at the time, but did not stand the wear during the wet weather in the winter anything like granite chippings. He has found that, if the tarred clinker is well looked after and is painted immediatcly any small cracks appear, the water is kept from entering the material. The hard frosts on several occasions during the last two winters did not damage the roads kept up in this way. He is gradually surfacing the whole of the roads in the borough with tarred clinker; but, owing to the restrictions now put upon the surveyors in the use of tar, this work will have to be postponed to a future date.

Mr. J. W. Birch, borough engineer, East Ham, states that broken destructor clinker has been used on various roads in East Ham, and except under very heavy traffic has given satisfactory results. Some experimental pieces have been laid in the following manner:—

(*a*) Broken tarred clinker, about 1¼-in. gauge, laid about 2 in. thick, topped with ⅜-in. tarred broken clinker on existing flint road surface.

(*b*) Broken tarred clinker, about 1¼-in. gauge, laid about 2 in. thick, and topped with ⅜-in. tarred slag on existing flint surface.

(*c*) Broken tarred clinker, about 1¼-in. gauge, laid about 2 in. thick, and topped with existing granite surface (after being sifted), the granite being laid dry and grouted with bituminous material.

(*d*) Broken clinker, about 1¼-in. gauge, laid dry, topped with existing granite surface (after being sifted), the whole being grouted in with pitch grout to within ½ in. of the surface, after which it was floated over with bituminous material and blinded in with ⅜-in. granite.

Items (*c*) and (*d*) have been laid on the breast of the road alongside the tramway track, over which there is a frequent service of motor 'buses. The pitch grout was made at the destructor works and consists of pitch, oil and flue dust from the destructor flues. In breaking the clinker down to 1¼-in. gauge a fair amount of small size clinker is obtained varying from 1 in. down to a very fine clinker resembling dust, which has been utilised in the following manner:—

1-in. gauge is used for the top portion of the sewage filters.

⅜-in clinker is used for:—

(*a*) Covering tarred surface of roads.

(*b*) Gritting roads during winter in time of frost.

A disadvantage was experienced in using ⅜-in. broken clinker for road work, as the same contained a considerable number of nails and small pieces of iron. The council recently purchased an electro-magnetic separator. The ⅜-in. and fine clinker is passed over this separator, which eliminates all metallic substance, thus allowing this material to be used for road work. The amount of current taken by the separator is 1½ units per hour—240 voltage.

The very fine clinker is used as follows:—

(*a*) Mixed with cement, it is laid on the public footpaths (*in situ*).

(*b*) Mixed with cement in the manufacture of drain inspection chamber covers (when fixed in public footpaths) the same being reinforced with old iron and steel.

(*c*) Filling in manhole covers in place of wood blocks.

(*d*) Binding in tar dressing of school playgrounds.

(*e*) Mixing with ballast for concrete in lieu of sand, when ballast is not suitable owing to the amount of loamy hoggin, which is sifted out, this leaving clean stone.

The clinker and cement used in lieu of wood blocks for manhole covers increases the weight of the cover by about 33 lb.

Mr. J. G. Carey, engineer and surveyor to the Heston and Isleworth Urban District Council, confirms the opinion expressed in the paper submitted to the members at the meeting at Hounslow on September 29, 1917, and has given the author permission to state that the road surfaces constructed under the various schedules have not been affected in any way during the past winter. He has also permitted the author to refer to the following extract from his paper, which is an exceedingly simple and economical process:—

CLINKER ASPHALTIC MACADAM, 2 IN. THICK, LAID IN A SINGLE COAT DIRECT ON THE EXISTING ROAD. AREA, 1,000 SQ. YDS.

The object of this experiment was to determine whether the fine clinker residual could be adapted as a road surfacing material without the use of a tarred base. For this purpose the old macadam surface was adjusted to proper levels and thoroughly re-rolled, leaving room for a finished thickness of 2 in. of the single coat clinker asphaltic macadam. The following formula was used:—

7·3 cub. ft. fine clinker residual (say 482 lb.).
68 lb. Portland cement.
65 lb. Clee Hill ¼-in. chippings.
65 lb. fine clinker retained on ⅛-in. screen (and passing ⅜-in.).
155 lb. Trinidad bitumen.

Analysis.	Per cent.
Bitumen soluble in C.S.2	13·60
Passing 200 mesh	18·00
,, 100 ,, ...	8·60
,, 80 ,, ...	4·65
,, 50 ,, ...	16·15
,, 40 ,, ...	4·30
,, 30 ,, ...	3·70
,, 20 ,, ...	5·40
,, 10 ,, ...	7·80
Retained 10 ,, ...	17·80
	100·00

The author is greatly indebted to Mr. W. W. Gladwell, county surveyor of Norfolk, for the following notes of experience in maintenance of roads in rural areas under his supervision:—

(1) CAUSES OF WEAR AND DETERIORATION OF ROAD SURFACES.

The roads in this county, owing to the dearth of manual and team labour and materials and the very heavy character of the traffic to which they have been and are now being subjected, have suffered to a very considerable extent, and deterioration of road surfaces is very apparent. In consequence of the War Department having acquired seven of the fourteen of this council's steam rollers for use overseas, the undesirable method of carrying out repairs to road surfaces by extensively patching has had to be resorted to, with its consequent attendant but unavoidable evil—that of discomfort to the users of the highway. Considerable difficulty has and is being experienced in obtaining team labour. For these reasons, both the Eastern and Highways Commitees have been compelled to resort to mechanical haulage. A 5-ton Foden steam wagon and a 5-ton Wallis and Stevens steam tractor have been purchased, and it had been decided to obtain two steam tractors in addition to the above. Mr. Gladwell is very favourably impressed with this method of haulage, as it has been conclusively proved that by this means material can be far more expeditiously and economically dealt with than by horse haulage. A saving of from 1s. 6d. to 1s. 9d. per ton has been effected. Owing to the geographical situation of this county, numerous military camps and aerodromes have been established, and the traffic to and fro is of a very heavy and extensive character. Serious damage has in consequence been caused to many sections of roads, especially during the period that works of construction were in progress.

Roads surfaced with flints have suffered from this cause to a far greater extent than those coated with granite.

Timber haulage is responsible also for the present defective condition of many of the roads in this county; this traffic is on the increase.

(2) HOW ROAD SURFACES ARE AFFECTED BY CLIMATIC CONDITIONS.

Many of the roads under my control are surfaced with flints, and in prolonged periods of drought disintegration of road surfaces ensues. This is especially noticeable where the subsoils are of a light character. As a means of preventing the

* Paper presented at the annual meeting of the Institution of Municipal and County Engineers.

surfaces breaking up, suitable binding has to be applied as soon as the surfaces become bare.

Granite surfaces are treated in a similar manner when the necessity arises.

Roads, especially where the subsoil is of chalk,—and there are many instances of this in the county—suffered very considerably from the action of frost during the past winter. The surfaces became blown, and in some instances were completely cut through. Where this occurred the material had to be taken out to a depth of from 9 in. to 12 in., and the defective section made good with suitable material.

(3) HOW AFFECTED BY HEAVY TRAFFIC.

The effect of heavy traffic depends largely on the nature of such traffic and the climatic conditions prevailing at the time. Timber haulage appears to cause more damage to road surfaces than any other type. Especially is this the case if carried out immediately after the frost. I have had many instances where the surfaces have been completely destroyed, necessitating recoating. The roads have suffered to a far greater extent from this traffic than by any other method of transport.

(4) THE EFFECT OF TARRING SURFACES OF ROADS CONSTRUCTED WITH—

1. Gravel.
2. Granite (water-bound).
3. Slag (water-bound).

1. The success or failure of tarring gravel surfaces depends to a great extent on the character of the traffic, nature of subsoil, surroundings and gradients. Efficient surface-water drainage is essential if satisfactory results are to be obtained. Under favourable conditions this treatment the author finds has added to the wearing qualities and prolonged the life of gravel-surfaced roads.

2. In pre-war days about 170 miles of granite-surfaced roads were tarred annually with very excellent results. Since this period about 80 miles only have been treated each year in consequence of many sections not being in sufficiently good condition, due to the causes previously given. This the author considers a highly satisfactory method of dealing with road surfaces, especially from an economical standpoint.

3. The author has had very good results from tarring roads surfaced with slag. The life of this material is considerably prolonged in consequence of this treatment.

(5) THE EFFECT OF LIGHT, FAST-MOVING TRAFFIC.

Light, fast-moving traffic has proved injurious to road surfaces. Owing to the sucking action of vehicles fitted with rubber-tyred wheels, the binding material is displaced, permitting the surface water to find its way between the joints of the metalling, thereby weakening the road and causing depressions and potholes to be formed. More especially has this occurred in the wheel tracks. With a view to obviating this damage, the wheel tracks of a three-mile road contiguous to an air station were surface-tarred last season. No damage has since been caused, and, judging from the present condition of the tarred surface, retarring will not be necessary this season. It is therefore intended to carry out this treatment on other sections of road where similar traffic conditions prevail.

(6) TREATMENT OF REPAIRS (POTHOLES): MATERIALS USED AND RESULT.

Owing to the prevalence of potholes, repairs have had to be carried out extensively. The author's practice is to have the surface of the road where repairs are required well swept. A coating of tar is then applied and on this granite chips of suitable gauge are laid, care being taken to leave the patch level with the surface of the road, with a view to avoiding a bumpy or uneven surface. Very good results have been obtained by using beach shingle, which wears remarkably well. In instances where there are a number of potholes in close proximity, the spaces between the potholes are picked up, and a continuous patch laid.

COMPARATIVE COSTS, &C., BETWEEN PRE-WAR AND PRESENT TIME.

Cost of granite per ton, carriage paid	12s. 6d.	18s. 6d.
Cost of flints per ton, carriage paid...	5s. 0d.	6s. 6d.-7s. 6d.
Average cost per mile carting per ton	1s. 0d.	1s. 9d.-2s. 0d.
Horse, cart and man per day ...	6s. 0d.	12s. 6d.
Two horses, cart and man per day ...	10s. 0d.	18s. 6d.
Surface tarring, per super. yard ...	1d.-1½d.	2½d.-3d.
Roadmen's wages, per day	2s. 8d.-3s. 0d.	5s. 0d.-5s. 4d.
Number of roadmen employed ...	700	300
Steam rollers at work...	14	7
District surveyors (12 main road districts)	12	8

In conclusion, the author wishes to express his thanks to those members who have carried out experiments in road surfacing with material to which he has made reference. After many years' experience in the supervision and maintenance of highways, the conclusion arrived at is that surfaces of highways in rural areas must in future be maintained by proper construction, drainage, and surfacing with material coated with some tarry or bituminous substance, having adhesive and elastic properties thoroughly consolidated. Surfaces constructed with water-bound material of any description have been proved to be expensive in maintenance, and are not suitable for the present-day traffic, owing to the cost of scavenging, watering, &c., apart from the inconvenience caused by the dust and its effect on public health.

CORRESPONDENCE.

(One man does not see everything.)
—EURIPIDES.

THE ALIGNMENT OF ROMAN ROADS.

To the Editor of THE SURVEYOR.

SIR,—The last paragraph in the "Things One Would Like to Know" column in your issue of September 27th raises a query as to the method followed by the Romans in aligning their roads. Not having read the letter of Mr. Moore, mentioned by your contributor, in which the help of astronomical observation is suggested, I am not in a position to criticise the idea, but the facts of the case do not appear to require recourse to a theory of that kind. Should any of your readers feel curiosity on the point they might, with advantage, refer to "Roman Roads in Britain," by Thos. Codrington, M.INST.C.E. A careful survey of hundreds of miles of Roman roads has left the author of this book with no doubt that in laying out a straight line of road between two points invisible from one another the Roman engineers worked from two intermediate points from which the extreme points were visible, bringing all four into line by means of smoke signals, and thus obtaining the straight alignment desired. The author points out that the straight reaches in which it was so often found convenient to set out a Roman road are commonly not absolutely straight, but, on the contrary, contain straight pieces not in true alignment, and he has observed that such pieces generally point to some natural or ancient landmark—such, for example, as a barrow. It is also to be remarked that changes in direction, when they are not influenced by the existence of towns or military stations which the road was intended to serve, almost always occur on high ground.

Mr. Codrington remarks that the straightness of the Roman roads is less remarkable than the grasp of the features of the country, which the roads appear to indicate as having been possessed by those who laid them out. The straightness is certainly a feature which has usurped a disproportionate amount of attention, since it is largely absent on numbers of Roman roads both in this country and abroad (it is strikingly absent from the Roman roads in Asia Minor —upon which St. Paul was a frequent traveller); but, personally, I am disposed to think that the value to the Roman engineers of the aboriginal traffic routes has never been sufficiently recognised. Pre-Roman Britain was not a roadless country—if by road we understand not a piece of construction but merely the beaten track indicating a custom of passing over the land along some defined line. The tracks and paths among all barbarous communities tend to establish themselves by a process of trial and error, as generations of travellers attempt to make their way across country without encountering easily avoidable obstacles, and in time there grows up a system of communications very intimately related to the physical conditions then obtaining. Now there was such a system here when the Romans arrived—great lines of road following long escarpments (like the Icknield Way), or feeling their way along the water partings (like Watling-street and the Fosse Way), and the invaders, knowing well enough that native paths offered reliable guidance to the existence of practical natural routes, accepted the lines thus indicated, and, where they needed roads, laid the old tracks out anew. It is not suggested, of course, that every meandering native road would have a value, while many features which had been real obstacles to the British would cease to operate as barriers among a people who were prepared to pave fords, bridge rivers, maintain ferries, throw causeways over marshes and construct an elaborate artificial travelling surface. The old and the new roads were thus often a few miles apart in places, but the latter were none the less relocations of the former, and the debt of the Romans to the immemorial tracks is only thinly disguised. Naturally the Romans must have needed to make many arterial roads in directions in which no existing tracks ran; but there is reason to think that most, if not all, of the great trunk lines of Roman road in Britain had native predecessors.—Yours, &c.,

REGINALD WELLBYE.

September 27, 1918.

Change of Address.—In consequence of the Government having commandeered their offices in Victoria-street, Westminster, the Albion Clay Company, Limited, have removed to Museum Station Buidings, 133-136 High Holborn, W.C. 1. (Telephone, Museum 3042; telegraphic address, "Sewerage, West Cent., London.")

National Salvage.

DISCUSSION AT CLEANSING SUPERINTENDENTS' CONFERENCE.—(*Conclusion.*)

A paper by Mr. David Currie, Director-General of National Salvage, on "Possibilities of Salvage and Utilisation of Waste," and one by Mr. J. C. Dawes, technical adviser to the National Salvage Council, on "Municipal Salvage," were discussed at considerable length at the recent annual conference of the Institute of Cleansing Superintendents. The first portion of the discussion appeared in our last issue, and the remainder follows herewith. The two papers will be found in our issues of August 30th and September 6th and 13th.

Mr. J. C. Blake, county organiser for Cheshire for the waste paper department, thanked the institute for the great help they had given in collecting waste paper, which had realised over £200,000 a year. At the present time they were collecting 6,000 tons per week and as there was a big shortage of paper coming from abroad it was imperative they should save all the waste paper they possibly could. They had no worry about packing waste paper and pressing it, as they had to do with old tins, and there was an absolutely immediate market for it.

Councillor Blackburn (Leeds) said that before the war they thought they were doing a good deal in the way of salvage, and if the Salvage Council had done nothing else, they had helped them very much by voluntary encouragement. They were now doing more in the way of salvage, and were collecting and selling waste paper at £8 10s. a ton. They were not ashamed to take an example from other towns, and they had visited Sheffield and Liverpool, and he had recommended to his council the methods adopted in Liverpool for dealing with waste. Referring to the different organisations, Mr. Blackburn urged that there should be Government control and unification of effort, which would be a great benefit to the municipalities. The National Salvage Council was doing a good work, but greater publicity should be given to the markets for disposal of waste, for some people were not able to find a market for the stuff salved.

Mr. R. Williamson (Manchester) said the conditions of different towns were not alike, and comparisons were not altogether fair. Smaller towns had much less waste to deal with, and they could not instal a laboratory as they had done in Liverpool. They therefore looked to the larger towns for assistance and there was also the cost of transit to be considered. Mr. Williamson referred to the production of steam by means of town's refuse and its values. He did not believe in municipalities clearing all the waste paper; what did it matter who disposed of it, or how it was disposed of, so long as it finally got to the proper place. None of them liked compulsion, and if things could be done in a voluntary manner all the better.

Mr. C. W. Laskey (Eccles) said one point had been scarcely touched in the discussion—the comparatively poor result of the National Salvage Council, due mainly to the apathy of the general public. As cleansing superintendents they had the best desire to make the work a success, but unless they got the assistance of the public, the results would not be satisfactory. They tried waste paper collecting assisted by the Lads' Brigade, but he doubted if the nett result of paper collected equalled that used in the issuing of handbills. They had to give it up, also pig-keeping, owing to the apathy of the public, who would not help the scheme. In fact school teachers were invited, but the Education Authorities thought it rather derogatory to the dignity of the children to ask them to go collecting waste paper and bring it to the municipal department. To his mind, it did not matter whether it was a paying proposition or not, it was work that should be done by the municipalities.

Mr. Nisbet (Local Government Board representative) stated that since the Leeds conference it had been difficult to keep up with the results. The salvage question was not "Will it pay?"—it had to be done in the national interest.

Mr. Currie, in replying, said he might be reckoned a passionate salvagist, and he admitted he was obsessed with the possibilities of national salvage. The more he looked into the subject the more he became attached to it. He had particularly enjoyed the remarks of Mr. Findlay and Mr. Blackburn. As to the remarks of Mr. Heavey, although they sounded very much like an attack on voluntary service, he did not take them as such, but rather as an expression of his keen desire to help the work of the National Salvage Council. As to the question of voluntary as against compulsory salvage, he was attached to the voluntary system. His experience was that people who were led by enthusiasts and voluntary workers would do voluntary work in a very able and thorough way. It was for cleansing superintendents to deal with waste, and salve it. Individuals could not deal with it thoroughly. They might pick out such things as paper, and it might pay them also to get the tins and bones out of the refuse, but there were odds and ends innumerable the individual could not possibly deal with, and that was what they had to deal with. What the cleansing departments had to do with the refuse was to turn it to commercial advantage. The question of compulsion did not immediately arise, and compulsory measures as to salvage would only be adopted as a last resort. In the meantime the voluntary system would continue. The National Salvage Council was not a Government department set up to dictate to them, but to investigate things for them; a body they could come to with their troubles and they would try and help them. "Mr. Heavey remarked that I said the Germans lost nothing—what I did say was that the Germans wasted nothing—which is a different thing altogether." The Germans had lost a good deal during the past four years—they had lost their honour, and in losing that they had lost everything worth having, and in the end they would lose the war.

Before the conference closed Mr. Dawes replied on the general discussion. He expressed a wish that the remarks made by the various speakers had taken a more technical form. He had referred in his paper to the possibilities and potentialities of the work and had thus given a lead. The discussion had notwithstanding been a most helpful and useful one. Touching again on industrial salvage, he said he was quite convinced that there was great scope in this direction throughout the country. Mr. Hopkinson, of Portsmouth, had sent up to the chair several test tubes containing useful by-products from seaweed. It was astonishing what could be done by concentrated effort supported by scientific investigation, and Mr. Hopkinson was to be complimented on his work. Referring to waste leather from old boots, &c., Mr. Dawes said that this material, after de-greasing, was valuable as a slow fertiliser, but the British farmer was somewhat prejudiced against its use. He understood that it was being used successfully in America. Mr. Heavey had expressed himself strongly, but he did not think he really meant to be understood exactly as he had spoken. He would like to say that Mr. Heavey was quite enthusiastic in salvage work, and had done more than most. For instance, he had organised a scheme for the utilisation of the waste from Covent Garden and other important markets, and was now collecting sufficient material to feed 700 pigs, which the City Corporation were keeping at Caledonian Market, Islington. More than this, he had salved a very large amount of waste paper, and was now taking from 25 to 30 tons of this material from refuse every week. All were interested in the Liverpool scheme, and the corporation were to be congratulated on the work that had been done. They had tackled what many still said was an impossible proposition, and had shown not only what was possible, but what was, with efficient organisation, quite practical. Mr. Greig had referred to the calorific value of fuel salved from refuse, and said his figures only showed a calorific value of 6,000 b.t.u. This fuel was not washed, and contained much dust, and this was quite sufficient to make the difference between the Sheffield and Glasgow figures. Mr. Priestley had quoted some really important figures on the relative values of salved fuel and ordinary refuse for steam raising purposes. His argument demonstrated once more that old ideas must give way to new ones, and we should do well to scrap many of our previous notions. The advisability of saving old tins was no longer a question of doubt. Quite a number of superintendents were now receiving high prices for prepared tin plate, and thousands of new containers were now being made from materials which had once been "old tins." Mr. Laskey had taken up the question of "totting" on refuse tips, but he could not support this procedure. It was opposed to the first principles of hygiene, and it was difficult to estimate the potential damage which could be done this way. In conclusion Mr. Dawes urged the importance of salving all materials containing fibre. All such material was urgently needed. We need have no fear of the achievements of the German. What he could do we could do also if we concentrated our efforts. Possibly we could beat him at his own game. The whole question was now before us, and it was for us to achieve the greatest success possible.

Brighton's National Kitchens.—The Brighton National Kitchen Sub-committee recommend the town council to increase the amount authorised to be spent on the establishment of two national kitchens from £1,450 to £2,200, for the purpose of converting a portion of the police station in Preston-circus into a kitchen. The scheme is estimated to cost £1,370, and it is proposed to provide for the preparation and sale of 2,000 portions of food daily.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Easington R.D.C.—The council have appointed a committee to consider the question of formulating a new set of building by-laws to meet modern requirements. The chairman of the Plans Committee, Mr. A. Pirvas, said they were living in new times, and the Local Government Board were setting a new standard of twelve houses to the acre. The strange thing in the past was the minimum in the by-laws had always been taken as the maximum; back streets and the number of houses per acre had been built according to minimum requirements. This was the vital consideration which had led the committee to suggest a new set of by-laws.

Ryton U.D.C.—The surveyor, Mr. J. P. Dalton, as instructed, submitted for the consideration of the council a clause for inclusion in the building by-laws, making provision for the erection of houses of a temporary nature and of a less substantial character. He pointed out that great consideration ought to be given to any clause before it was accepted. Replying to a member, the surveyor said it was a suggestion from the Local Government Board that such a clause should be inserted in the by-laws. The chairman considered it wiser to consider cases as they arose. This was approved, and the chairman observed that the matter was largely in the hands of the Plans Committee.

Stoke-on-Trent T.C.—The town council have agreed to a proposal to carry out extensions at the Henley abattoirs, at an estimated cost of between £6,000 and £7,000. As the work is to be undertaken at the urgent request of the Ministry of Food, application is being made to the Government for a contribution towards the scheme.

REFUSE COLLECTION AND DISPOSAL.

Barnes U.D.C.—It is proposed to provide additional plant at the refuse destructor at an estimated cost of £1,220.

Fulham B.C.—The borough council are seeking authority to effect alterations and improvements to the dust destructor at an estimated cost of £4,700.

Hayle U.D.C.—The surveyor, Mr. Z. W. Chinn, reported that the sale of waste paper had realised £4 7s. 9d., and after paying expenses £1 18s. 9d. was handed to the Red Cross Society.

Kingston-on-Thames T.C.—The borough surveyor, Mr. R. H. Clucas, reported to the Sanitary Committee that about 8 cwt. of fat had been extracted from condemned meat, and £344 12s. 4d. had been received in respect of waste paper and cardboard.

ROADS AND MATERIALS.

Bromley (Kent) R.D.C.—In connection with the estimate of £2,655 as the cost of repair of certain roads over which unusually heavy traffic had passed, it was stated that the War Office would pay half of that amount. Alderman Waring did not think half was sufficient in view of what the average cost of repairs to those roads was under normal conditions. The council resolved to submit a claim through the Road Board.

Devon C.C.—It was stated that, to meet the heavy expenses on roads and other services, the council had accumulated during the war a balance of £35,965, in addition to the investment of £50,000 in 5 per Cent War Bonds. With respect to an allegation of extravagance upon road maintenance, it was explained that the repair of damage caused by timber traffic was expensive, and also that the council had been unable to obtain certain machinery, while there was also a shortage of labour. Mr. Metherell said tenders were invited for remaking the Bideford-Hartland road, one being for £20,000. This was not accepted, and the county surveyor said he could do the work for the same money. They had spent £28,000 in doing not much more than half, and he thought the Bideford end would require a similar amount. The part made was good road, and was bearing what was really railway traffic. He was of opinion that it was better to proceed by contract. Colonel Moore Stevens thought that money would be saved by paying more for better road materials.

Lewisham B.C.—The Works and Highways Committee report that four dust-carts and two slop-carts realised £15 10s., against which has to be set £2 5s. 2d. for auctioneer's commission and charges and £3 for conveyance. The report states: "The committee do not think it desirable to dispose of any more old stock in this way at the present time."

Newhaven U.D.C.—The council have forwarded a protest to the Road Board against the delay in completing the Newhaven to Seaford road. They have also appealed to the Local Government Board to order the East Sussex County Council to at once put High-street, Bridge-street, and part of the Brighton road running through Newhaven in sound repair, as they are in a disgraceful condition every winter consequent upon the heavy traffic they have to carry.

Newry No. 1 (Co. Down) R.D.C.—In his report for the forthcoming half-yearly meeting of the district council the county surveyor states that he has been unable as yet to make arrangements for the execution of fifteen of the proposals for steam rolling and supply of materials, for which no contractors had been obtained at the last half-yearly meeting. His estimate for the ensuing financial year is £9,470 (5s. 11d. below the limit of expenditure, which has been raised by £4,000 since the outbreak of war), but he says that as the cost of road work depends almost entirely on the rate of wages, the limit of expenditure ought now to be £10,015 to enable the same amount of work to be done as under the old limit of £5,472 7s. 11d.

Okehampton R.D.C.—The surveyor, Mr. S. Hooper, reported that he had made an arrangement with the commanding officer for the employment of six German prisoners on the roads at any time, with a promise of more men at a later period.

Pickering R.D.C.—With respect to complaints as to the bad condition of the roads the clerk stated that he had written to the labour officer at Northallerton for a gang of German prisoners to work on the road, and that officer referred him to the Northern Command, who in turn referred him to the Employment Bureau Committee, London, and he had not heard anything since.

Stockton R.D.C.—The council have approved the plan of a scheme for the diversion of the road between Billingham and Haverton Hill, by which, it is stated, a great improvement will be obtained.

Windsor R.D.C.—It was intimated that the Board of Trade had given the Road Board authority to pay £250 to the council on account of extraordinary traffic.

SEWERAGE AND SEWAGE DISPOSAL.

Barnet R.D.C.—The tenancy of the land having expired, the council have authorised the surveyor, Mr. S. Cripps, to make arrangements for the cultivation of the sewage works farm.

Lambeth B.C.—It was reported that considerable damage had been caused to house property in Herne Hill, Loughborough Junction, and parts of West Norwood by floodings, and that many owners and occupiers had in consequence refused to pay the sewers' rate. About 350 premises had been dealt with by the sanitary department, and the approximate cost of the work to the borough council was £210. The matter was referred to the Finance Committee.

Worcester T.C.—The Water and Sewerage Committee recommend the purchase of a vertical air compressor, at an estimated cost of £463, for the activated sludge process at the sewage disposal works.

WATER, GAS, AND ELECTRICITY.

Amble U.D.C.—The council have reached a decision to purchase land near the reservoir at Morwick for the construction of an additional reservoir of a capacity of 1,000,000 gallons.

Cumnock T.C.—It has been resolved to carry out a scheme for the extension of the water supply.

Derby T.C.—With respect to the suggestion that the town council should ask for their maximum proportion of water under the Derwent Valley Water Act—*i.e.*, 25 per cent of the water—Alderman Bemrose stated that Mr. James Watson, water engineer to the Bradford Corporation, had been consulted, and he advised that the town council should take full advantage of their maximum. The present expenditure on the Derwent Valley scheme, it was stated, was about £3,000,000, Derby's share being about one-fourth. The estimated cost of the proposed new reservoir in Ashopton Valley was £536,000, with an additional £15,000 for the land and £63,600 for a special pipe. That would give them about $6\frac{3}{4}$ additional gallons of water daily, practically the whole of which would be required to meet the demands of Nottingham and Sheffield. Derby was entitled to a quarter of the extra $6\frac{3}{4}$ million gallons, but did not need it. The proposal was that they should, through the board, resell to the two cities their surplus supplies for probably between £3,000 and £4,000. This would reduce Derby's new annual charge from £10,000 to £7,000.

East Ham T.C.—It was reported that there had been a loss of £7,700 on the electricity undertaking last year.

Edinburgh T.C.—Owing to their inability to meet the demands upon them for electricity, the Electric Lighting Committee have framed a representation to the Ministry of Muni-

tions for authority to increase their plant. The representation will be submitted to Leith Town Council, and if approved the representation will be a joint one. Some time ago the Ministry refused permission to the committee to proceed with the new station at Portobello, but it was resolved again to approach the Ministry at a later stage with larger proposals for supplying a wider district. In the meantime the request to the Ministry is for limited authority to erect two new boilers at the M'Donald-road station.

Newbury T.C.—The town council have approved a scheme for the manufacture of carburetted hydrogen gas to be added to the coal gas.

PERSONAL.

Mr. T. Powell, surveyor to the Wem Urban District Council, has been voted an increase of salary of £15.

Mr. E. D. Groves, surveyor to the Great Austell Urban District Council, has been voted a war bonus of £50.

Mr R. Tonkin, builder and contractor, of Tredawol, Paul, has been appointed temporary deputy surveyor and sanitary inspector to the Paul Urban District Council.

Mr. E. J. Lovegrove, borough surveyor of Hornsey, has been deputed to represent the town council at the housing conference convened by the London County Council.

Captain Charles F. W. Marsh, engineer and surveyor to the Orset: Rural District Council, who is on service with the Salonica force, is, we regret to learn, reported missing.

Lieutenant R. E. A. McBeth, who was killed some time ago in an aviation accident at a training camp near Birmingham, was before he joined the Army assistant to the city engineer of Toronto.

Mr. F. E. Simpson, who has been acting as county surveyor for No. 2 district of Devon in place of Mr. Simpson (on service) for over eighteen months, has had his salary increased to £400 a year.

Captain (temporary Major) Hawkins, county surveyor, Berkshire, has been transferred from the Royal Engineers to the Royal Air Force as an Assistant Director, with the rank of Lieutenant-Colonel.

Major F. W. Doane, city engineer of Halifax, Nova Scotia, who has been acting as quartermaster in some of the British military camps, has returned to Nova Scotia at the urgent request of the Halifax Commissioners.

Mr. W. R. Humphrey, of Colchester, having declined the position of borough surveyor and sanitary inspector to the Wilton Town Council, the town council have appointed Mr. A. Colborne, sanitary inspector to the Amesbury Rural District Council.

Mr. Peter Gaskell, architect, has been unanimously selected as Lord Mayor and Sheriff of Hull for the ensuing year. A member of the Society of Architects and the Institution of Municipal and County Engineers, and licentiate of the R.I.B.A., he has for the past twenty years been recognised as an authority on ice factories and cold storage installations, many of which have been erected in various parts of the kingdom from his designs and under his supervision.

The Collection and Disposal of Waste.—An Order in Council makes an amendment in the Defence of the Realm Regulations providing that the Army Council may, with the concurrence of the departments concerned, regulate, prohibit, or give directions with respect to the disposal of waste, and they may confer on any local authority such powers as appear necessary for the purpose of giving effect to the Order, and may define what articles and material are to be regarded as waste.

Manchester's Activated Sludge Works.—To-morrow (Saturday), at 2.30 p.m., a visit will be paid by the members of the Association of Managers of Sewage Disposal Works to the Withington works of the Manchester Corporation, and an inspection made, under the guidance of Mr. H. Edwards, manager, and Dr. E. Ardern, chief chemist, of the activated sludge process in operation there. Dr. Ardern has kindly promised to give the result of his recent experiments with this process of purification. Other objects of interest include the Emscher tank, and a small centrifugal sludge dryer.

Blyth Town-planning Scheme.—Mr. G. P. Pepler held an inquiry recently at Blyth on behalf of the Local Government Board into the application of the Blyth Urban District Council for sanction to promote a town-planning scheme. The surveyor, Mr. L. Lesper, who, it was stated, had gone thoroughly into the scheme, explained that for five years before the war 500 houses had been built under very undesirable conditions, the sanitary results being in many instances deplorable. The development on the harbour and other works was causing a great demand for workmen's houses and there was much need for improvement in regard to roads. It was therefore desirable that future development should proceed upon better lines.

HOUSING NOW AND AFTER THE WAR.

THE GOVERNMENT SCHEME.

Mr Hayes Fisher (President of the Local Government Board), addressing a conference at Sheffield on Tuesday of representatives of county boroughs of Lancashire and the West Riding of Yorkshire, on the question of housing after the war, said his great fear was that everything might be lost by differing about precise plans. He thought the Government scheme was the best that had been produced, and until he saw a better plan he would advise its acceptance. Whenever he approached the Chancellor of the Exchequer on this question he was frowned at—(laughter)—because the Chancellor was going to be called upon to find interest and sinking fund on seven thousand millions of money. He had been asked whether it was intended that local authorities should get economic rents from the houses they provided. His answer was that the Government had come to the conclusion that there was no likelihood of an economic rent being produced from these houses for some years after the war. Therefore the Government scheme was that they would bear the loss with regard to 75 per cent of the expenditure, the local authority to bear the loss on the remaining 25 per cent. He could not hold out any hope that the Government would change their mind with regard to a penny rate limit only being borne by the local authority. This was an emergency policy, and many did not believe that the State ought to own or control houses.

Bentley Urban District Council have a scheme in preparation for 300 houses.

Evesham Rural District Council have approved a scheme for twenty-four houses.

Brecon Rural District Council have sent to the Local Government Board a scheme for the provision of housing after the war at Sennybridge, Talybont, Llanfihangel-Talyllyn, and Llanhamlach.

In connection with the five type plans of Scottish dwellings reproduced in our issue of the 13th ult., Messrs. G. Tucker & Son, Limited, Loughborough, inform us that they made the bulk of the old-fashioned hand-made pantiles for the roofs, as they did for similar housing at Rosyth.

Steyning West Rural District Council have almost completed the task of negotiating for sites on which to erect cottages after the war, and it is hoped soon to obtain the Local Government Board's sanction to enter into the necessary contracts. In connection with the scheme the surveyor, Mr. F. Slaughter, has been most indefatigable in attacking the many difficulties that had to be faced, and a great deal of credit for the success obtained must be accorded to him.

FOR OTHER ADVERTISEMENTS
See End of Paper.

FOR SALE—14-inch Surveyor's Level with Tripod and Staff complete.—Apply, Freeman, Builder, Oundle. (3,883)

THE
UNIVERSITY OF LIVERPOOL.
SCHOOL OF ARCHITECTURE,
including
DEPARTMENT OF CIVIC DESIGN.
Professor of Architecture:
C. H. REILLY, M.A., F.R.I.B.A.
SCHOOL OF ARCHITECTURE.

The School provides a thorough theoretical and practical training for students wishing to enter the Architectural Profession. The courses, which lead to a degree (B.Arch.), a Diploma and a Certificate, begin on October 7th. After a two-years' course students obtaining a first-class certificate are exempted from the Intermediate Examination of the Royal Institute of British Architects. A special certificate of the University is given in Architectural Design. The Designs required as testimonials of study for the Final R.I.B.A. are made in the School as part of the second year work.

DEPARTMENT OF CIVIC DESIGN.
Professor of Civic Design:
L. P. ABERCROMBIE, M.A., A.R.I.B.A.

The department provides a training for Architects and Engineers who wish to specialise in Town Planning. The courses lead to a Certificate and Diploma. The session consists of the Autumn and Lent Terms. Autumn Term begins on October 7th.

Prospectuses of day and evening classes may be obtained on application to the Registrar of the University.

EDWARD CAREY, Registrar.
(3,884)

SUBJECT MATTERS FOR PAPERS.

INSTITUTION OF MUNICIPAL ENGINEERS' SUGGESTIONS.

In inviting papers for the forthcoming annual meeting at Southall, Middlesex, the Institution of Municipal Engineers offer the following suggestions for subject matters:—

General.—Methods for filing to be adopted in a municipal engineer's office. Statistics for municipal engineers.

Surveying.—Topography by phototheodolite. Description of any actual survey operations carried out and the instruments used.

Sewerage and Drainage.—Recording rate of flow in times of storm. Pressure on sewer pipes at varying depths in different soils. Maintenance of a sewerage system in a mining district. Description of design and lay-out of a drainage scheme in actual practice. Sewer and drain ventilation. Removal of silt and obstructions from sewers. Sewer work in a tunnel. Flood prevention works. Air compressing plant. Pumping machinery and tests. Laying sewers in unstable soils.

Sewage Disposal.—Purification of trade wastes. Description of and results obtained at a particular sewage disposal works. Experiments on tankage settlement. The economical management of a sewage irrigation farm. Records of flow into sewage disposal works. Tidal and current observations. Utilisation of sewage sludge. The treatment of sewage by activated sludge.

Water Supply.—Description of a waterworks undertaking. Experiments in flow, evaporation and absorption. Softening of water. Water purification. Removal of impurities from drinking water. Measuring and supply meters. Detection and prevention of waste. Maintenance of capacity of mains. Reinforced concrete water tower.

Road Making.—Road foundations and drainage. Maintenance of roads in mining districts. Road surfacing, its value and cost. Suggestions for improvement of roads in rural districts. State, county or local authority control of roads. Widths of roads and footpaths for various kinds of traffic. Dustless roads. Effect of motor vehicles on roads.

Bridges.—Description of a bridge, with details. Description of a reinforced concrete bridge, with details. Under bridges, over bridges and culverts.

Tramways.—Electric *v.* railless traction. Corrugation in tram rails. Maintenance of tracks. Tramway construction. Light railway construction.

Buildings, &c.—Protection of buildings against fire. Building by-laws; (*a*) urban, (*b*) rural. New building materials. Suggestions for economy in erection of working-class houses. Maintenance of buildings in mining districts. National kitchens and restaurants. Testing building materials. Markets Asylums. Housing schemes. Schools. Fire stations and protection against fire in towns. Fire appliances. Municipal piggeries. Municipal rabbitries. Laying out parks and pleasure grounds. Laying out cemeteries.

Sanitation.—Suggestions for scavenging in rural districts.

Public Health Law.—Suggestions for remedying of law relating to admission of trade wastes into sewers. Town planning procedure (suggestions for simplification). Town planning schemes. Anomalies in building by-law cases before the courts.

MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE AT LEICESTER.

At the annual conference of the Municipal Tramways Association held last week at Leicester, about 140 delegates assembled under the presidency of Alderman S. Flint, chairman of the Leicester Tramways Committee.

Alderman Flint, in the course of his presidential address, remarked that the continued advance in wages and the prices of all classes of materials had placed heavy burdens on many of their undertakings, and municipalities that had hesitated to increase fares were in some cases faced with probable deficits. In regard to the future, all the indications were that they would have to carry on under greater difficulties than any they had yet had to face.

A paper on the "Post-War Position of Electric Power Supply," by Mr. E. Hatton, of Newcastle-on-Tyne, was followed by a discussion in which the Board of Trade proposal for taking over existing power-generating stations with a view to establishing a national system of supply was considerably criticised, and while some delegates favoured the idea of a national system others expressed a strong view that this would result in higher prices to consumers.

The vacancies on the Executive Committee were filled by the election of Alderman Timson (Portsmouth), Mr. Horsfield (Walsall), Mr. Fell (London), Mr. Hamilton (Leeds), and Mr. Holford (Salford).

Electricity Works Purchase.—Rotherham Corporation have purchased the electric lighting undertaking of Mexborough and Swinton Tramways Company for £45,000. The date of the transfer is fixed for October 1st.

Borough Council and Horse-feeding.—Camberwell Borough Council have adopted a recommendation of the Works and General Purposes Committee, that the Board of Trade should be informed that the council, who had a very large stud, considered that the new ration scheme for horses was ill-advised and insufficient, and would have a prejudicial effect upon the health of the horses.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

TEMPORARY INSPECTOR OF NUISANCES.—October 8th.—Sedgefield Rural District Council. £150 a year.—Mr. J. W. Lodge, clerk, Council Offices, Sedgefield, Ferryhill, Durham.

SANITARY INSPECTOR AND SURVEYOR.—October 9th.—Newport (Salop) Urban District Council. £150 a year.—Mr. J. S. Underhill, clerk, Urban Council Offices, Newport Salop.

REFUSE SALVAGE OFFICER.—October 10th.—Hackney Borough Council. £450-£500 a year.—Mr. N. Scorgie, acting town clerk, Mare-street, Hackney, London, E. 8.

SURVEYOR'S CLERK AND ASSISTANT.—October 12th.—Coulsdon and Purley Urban District Council.—Mr. Alex. Clark, acting surveyor, Council Offices, Purley, Surrey.

WORKING ROAD FOREMAN.—October 12th.—Epping Rural District Council. 40s. per week.—Mr. F. Forrester, district surveyor, Thornwood, Epping.

SURVEYOR AND SANITARY INSPECTOR.—October 14th.—Penrith Urban District Council. £230 a year.—Mr. G. Wainwright, clerk, Town Hall Penrith.

SURVEYOR AND INSPECTOR'S ASSISTANT.—October 18th.—Newmarket Urban District Council.—Mr. W. H. Eley, engineer and surveyor, Town Hall, Newmarket.

PRIME COST CLERK.—Woolwich Borough Council. £2 10s. per week, with war bonus of 10s.—Borough Engineer, Town Hall, Woolwich.

SANITARY INSPECTORS.—Medical Department of East Africa. £200-£250, with a uniform allowance of £10.—The Crown Agents for the Colonies, 4 Millbank, London, S.W. 1.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

STOCKTON.—October 12th.—For alterations at the new maternity home.—The Borough Engineer, Victoria Buildings, Stockton.

BEDFORD.—November 13th.—For the erection of buildings and reinforced concrete coal bunkers.—The Engineer, Electricity Works, Cauldwell-road, Bedford.

Engineering: Iron and Steel.

MANCHESTER.—October 11th.—For the supply and erection of a coal conveying plant.—Mr. F. E. Hughes, Town Hall, Manchester.

BATTLE.—October 19th.—For erecting a wall.—Mr. F. C. Shepherd, clerk, Rural Council Offices, Battle, Sussex.

Roads.

BEDLINGTONSHIRE.—October 7th.—For the supply of hand-broken whinstone.—Mr. W. Hall, acting surveyor, Urban Council Offices, Bedlington, Northumberland.

WHITCHURCH.—October 14th.—For steam rolling the district roads.—Mr. H. Grinham, acting clerk, Rural District Council, Whitchurch, Hants.

Sanitary.

JOHANNESBURG.—January 8th.—For the supply of 5,000 sanitary pails with eyelet holes and lids for the same.—Department of Overseas Trade (Development and Intelligence), 75 Basinghall-street, E.C. 2.

Miscellaneous.

GELLYGAER.—October 14th.—For the supply of limestone, paving, kerb, and channel, drain pipes, cement and lime,

cast-iron goods, smithwork, ironmongery, brushes, oils and paint and oilskin suits.—Mr. T. Rees Gabe, acting surveyor, Urban Council Offices, Hengoed, Glam.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

OCTOBER.

4.—Municipal Waterworks Association: Annual general meeting at Birmingham.

4.—Institution of Mechanical Engineers: Dr. W. Cawthorne Unwin delivers the Thomas Hawksley lecture on "The Experimental Study of the Mechanical Properties of Materials." Institution of Civil Engineers. 6 p.m.

5.—Association of Managers of Sewage Disposal Works: Meeting at Withington.

9-10.—Institution of Municipal Engineers: Annual meeting at Southall, Middlesex.

APPOINTMENTS OPEN.

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NEWMARKET URBAN DISTRICT COUNCIL.

SURVEYOR AND INSPECTOR'S GENERAL ASSISTANT AND CLERK.

Applications are invited for the above temporary appointment, which, if suitable, will be for the duration of war.

Applications, in candidate's own handwriting, stating technical qualifications, clerical proficiency, and experience in similar positions, also salary required, to be accompanied by three recent testimonials, and sent to the undersigned not later than October 18th, 1918, from whom further particulars may be obtained.

WILLIAM H. ELEY, ASSOC.M.INST.C.E.,
Engineer and Surveyor.

Town Hall,
Newmarket.
October 1, 1918. (3,882)

AYLESBURY RURAL DISTRICT COUNCIL.

Thoroughly experienced Steam Roller Driver required.

Apply, with copies of three recent testimonials, stating age, experience, and wages expected, to R. T. Stewart, Surveyor, 21, Walton-street, Aylesbury, by October 5th. (3,874)

COULSDON AND PURLEY URBAN DISTRICT COUNCIL.

SURVEYOR'S CLERK AND ASSISTANT.

Applications for the above appointment are invited from candidates (male or female) who are acquainted with the clerical duties of the Surveyor to a Local Authority.

Replies, in own handwriting, stating whether typists, age, previous experience, and salary required, accompanied by copies of two recent testimonials, should be addressed to the undersigned, on or before 12th October, 1918.

ALEX. CLARK,
Acting Surveyor to the Council.

Council Offices,
Purley, Surrey. (3,875)

EPPING RURAL DISTRICT COUNCIL.

PARISH OF CHIGWELL.

WORKING ROAD FOREMAN.

Applications are invited for the post of Working Road Foreman to take charge of the District Roads (about 12 miles in length) in the above Parish.

The person appointed must reside in the Parish and have a good practical knowledge of road making and steam rolling.

Wages, 40s. per week.

Applications, in candidate's own handwriting, stating age, &c., accompanied by copies of two recent testimonials, which will not be returned, to be sent to me on or before the 12th October, 1918.

(By order)
F. FORRESTER,
District Surveyor.

Thornwood,
Epping.
October 1, 1918. (3,881)

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH
EXPANDED METAL.

EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet.
Mr. SAMUEL HUTTON, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED
(Patentees and Manufacturers of Expanded Metal).
Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.
Works: STRANTON WORKS, WEST HARTLEPOOL.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. OCTOBER 11, 1918. No. 1,395.

Minutes of Proceedings.

Invalid By-laws (II.).

There are several cases in which by-laws have been held to be unreasonable, a few of which will suffice to illustrate this principle—viz.: a by-law prohibiting any person from selling or hawking articles on the foreshore, except in pursuance of an agreement with the local authority (*Parker* v. *Bournemouth Corporation* [66 J.P., 440]), a by-law prohibiting the selling or distribution in any street or public place of papers, &c., devoted wholly or mainly to giving information as to the probable result of races, &c. (*Ennisworthy Urban District Council* v. *Field* [1904, 2 I.R., 518]), a by-law imposing a penalty if a cart was so loaded that manure fell from it (*Ronaldson* v. *Williamson* [1911; S.C. (J.), 102]), and by-laws in restraint of trade (*Elwood* v. *Bullock* [1844, 6 Q.B., 383]). So far as we are aware the only instance of a *building* by-law having been held to be unreasonable is to be found in the comparatively recent case of *Governors of Repton School* v. *Repton Rural District Council* (referred to in THE SURVEYOR of 16th November, 1917, at p. 418), which will no doubt be fresh in our readers' memories, and in which it will be remembered the by-law condemned was one requiring the provision of an air-space in the rear of new domestic buildings, in the form of No. 54 of the Local Government Board's Model By-laws. This decision was based upon the consideration that, under Sec. 23 of the Public Health Acts Amendment Act, 1907, the making of any addition to an existing building by raising any part of the roof, by altering a wall or making any projection from the building (but so far as regards the addition only) is to be deemed to be the erection of a new building; and that the by-law in question would prevent an owner from making such an addition, because of the impossibility of providing the required air-space. It would appear to have escaped the notice of the Court that this section is only in force in districts in which it is applied by the Local Government Board; but unless and until the decision is overruled it will obviously be useless to attempt to enforce a by-law in this form even in cases quite outside the scope of the section, and in which the provision of an air-space may be absolutely essential in the interests of the public health. It will apparently be necessary, therefore, for local authorities to adopt a revised form of the by-law, so framed as to exclude from its operation any addition to an old building which is already provided with a sufficient air-space.

* * * *

Institution of Municipal Engineers.

In view of the fact that the success which has attended the Institution of Municipal Engineers since its foundation ten years ago is very largely due to the energy and ability displayed by the secretary, Mr. B. Wyand, it was very appropriate that that gentleman should have seized the opportunity afforded by the tenth annual meeting to present a paper descriptive of the activities and growth of the institution. From the very beginning of their work, the council have never been afraid of novel and unconventional methods, and it is to this that the institution owes much of the popularity which it enjoys. For example, we may mention the interest which has always been taken in the welfare of the ordinary members. As Mr. Wyand said, "These men have a first call upon the institution, for the material prosperity of its humblest members claims priority over the mental development of the relatively affluent." Again, in the matter of examinations, this institution is, so far as we are aware, unique in allowing the candidate to bring his library into the examination room and to consult it as he pleases. In other words, an attempt is made, not to put a premium on cramming, but to reproduce for examination purposes the ordinary conditions of daily work. Another matter worthy of note is the establishment of a Mutual Aid and Defence Fund—an indication that the institution is ready to take up the cudgels on behalf of its members in case of need. The question of combination with the older institution was also mentioned by Mr. Wyand, and this we deal with in another "Minute." Until this happy event takes place, we cordially wish the institution every success and a prosperity even greater than it has hitherto enjoyed.

* * * *

The President's Address.

The election of Mr. Reginald Brown, M.INST.C.E., as president of the Institution of Municipal Engineers for the ensuing year gives cause for double congratulation; for while on the one hand Mr. Brown receives the highest honour which the institution has it in its power to bestow, on the other hand that body secures the services of a gentleman of proved energy, ability and experience. The fact that since his appointment in 1901 as surveyor and engineer to the Southall-Norwood Urban District Council the population of the district has increased from about 12,000 to over 30,000 gives some idea of the amount and variety of the work which has demanded his attention. The undoubted success with which he has accomplished this work proves him to be a man of vigour and ideas and an ideal head of the institution over which he is now called to preside. Mr. Brown's presidential address, which was delivered at the annual meeting on Wednesday, dealt with some of the main questions that arise in connection with the reform of local government, such as further devolution of power from the central authority, the placing of the present system of rating on a more equitable basis, and the future of town planning. There can be little doubt that after the war the general trend of the development of our political system will be in the direction of devolution. Even before the war it was generally agreed that the House of Commons was overworked, and that too much of its time was taken up with matters of purely local interest. In the future it is probable that local authorities will have more freedom of action, and the new conditions will cast new responsibilities on their engineers. As regards rating reform, we have more than once urged that some drastic action is necessary. The application of a financial system which was devised in the reign of Queen Elizabeth for the relief of distress to all the purposes of modern local government affords an excellent example of the characteristic British method of development by the adaptation of rules to convenience. But in rating this method has been carried quite far enough, and some comprehensive new scheme of local taxation is urgently required. Other matters to which Mr. Brown referred were the inland transport problem and the utilisation of waste—both matters of immediate importance. We are confident that we are expressing the views of all our readers when we wish him a successful year of office.

* * * *

Union.

A considerable section of the report of the council of the Institution of Municipal Engineers for the past year is devoted to what is called the "organisation of the municipal engineering profession." The matter was first mooted by the president of the older institution at Hastings, and upon the attention of the council being called to his remarks, a series of resolutions was adopted having in view the fusion of the two institutions into one strong body, representative of every section of the profession. There is so much to be said in favour of this step, and it has been the subject of discussion for so long that it is highly satisfactory to find that at last some practical steps are being taken in the matter. Last July a resolution was passed inviting the Institution of Municipal and County Engineers to appoint three members of their council to meet an equal number of representatives of the other institution to discuss the whole question and to report. The Institution of Municipal and County Engineers have now appointed a committee of their

council, and a first meeting is being arranged. The outcome of this meeting will be awaited with considerable interest. In our view each institution has something to gain from the special characteristics of the other, and it is only by presenting a united front that the profession as a whole can hope to gain the ear of the higher and local authorities and of the general public upon questions relating to the general welfare of municipal engineers.

* * * *

Tarred Slag for Roads.

At a recent meeting of the Quarry Managers' Association, the suggestion was made in the course of a paper by Mr. W. Jenkinson that there is a decided tendency on the part of surveyors at the present time to use tarred slag rather than tarred granite or limestone for road-making purposes. Mr. Jenkinson naturally looked at the matter purely from the trade point of view, and, beginning with the assumption that surveyors have no natural bias in favour of slag, sought for an explanation of the preference they are inclined to show for this material. With two suggested causes—namely, the present Government control of road stone and the advertising enterprise of those interested in the sale of slag—we have nothing to do. The former is temporary in its operation and the latter is purely a trading consideration. We are, however, directly interested in the very pertinent observations that were made with regard to the suitability of different kinds of granite for use in the construction of bituminous roads. We cordially agree that "any old stone dipped in tar in any old way as long as it is black is not tarred macadam;" and the sooner this fact is realised by all quarry owners and managers, the better it will be for the trade. The truth is that fine-grained granites are as a rule not suitable for the manufacture of tarred macadam, owing to their non-absorbent character. What is required is a coarse-grained stone into which both heat and tar will penetrate, and which will retain its bituminous character under the strain of traffic. In calling attention to this matter Mr. Jenkinson rendered a service not only to the trade, but also to highway surveyors, who are always anxious to obtain the best material for their purpose. Even if the right class of stone be used, tarred granite will still have to regard slag as a serious competitor, but we do not doubt that, if the best processes of manufacture are adopted, it will be able to retain its proper place in the market.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

NATIONAL KITCHENS.

To the Editor of The Surveyor.

Sir,—I wish to support Mr. Whyte's plea in your issue of October 4th for the establishment of national kitchens as a permanent feature of communal work. As chairman of a local committee which has been running a communal kitchen for the last ten months, I have had some experience in the matter, and one of the first points that should be made clear is that these kitchens are not intended solely for the use of the poor, but for *all* classes. In our case it was some time before this was recognised to any extent, but at present our customers include a large number of well-to-do people who find it convenient to purchase their food in this way, and are well satisfied with the quality of the goods supplied.

Another point is the question of making the kitchens self-supporting. We find no difficulty whatever in doing this. After ten months' working we have a reserve fund equal to our capital and are in a position to eliminate all voluntary assistance and still make a good profit. Having regard to the number of cases in which considerable sums have been lost in connection with similar kitchens, I may state that in my opinion success can best be secured if the working of the kitchen is placed in the hands of a special committee of persons with experience and enthusiasm. In our case the committee was appointed by the local Council of Social Welfare, and the kitchen is *not* under the auspices of the local authority. Then it is important to start in a small way and not to incur great initial expenditure. In our case we had only £98 capital all told, and our output has grown from £18 per week during the first six months to £35 per week at the present time. Again, it is essential that the cooks should be well paid, as it is upon them that the success of the kitchen depends. Another important factor in obtaining success is to supply the food of the highest possible quality. We have done this and have some customers from neighbouring districts which have their own kitchens. Good quality food is the best possible advertisement and has secured us a gradual permanent increase in our output.

I hope that the results of my experience may be useful to others.—Yours, &c.,

W. C. Easdale.

28 Victoria-street, S.W. 1.
October 7, 1918.

THE INSTITUTION OF MUNICIPAL ENGINEERS AND WAR BONUSES.

To the Editor of The Surveyor.

Sir,—I see by the minutes of my council's last meeting that a letter from the Institution of Municipal Engineers on the subject of war bonuses was ordered to lie on the table.

Seeing that I am not a member of this institution, and strongly object to the pushful and tactless manner in which it thrusts itself before the public, I think an apology is due from the author of this letter for writing my council on such a subject without consulting the person most concerned—myself.

I know that the secretary of this institution has taken credit for obtaining some surveyors a war bonus, but if he is going "to butt in" everywhere unasked, he is evidently going to do more harm than good.

If I had wanted any assistance as an engineer, I should have approached the Institution of Municipal and County Engineers, of which institution I have been a member for many years, as it is an institution which would carry far greater weight than the Institution of Municipal Engineers can ever hope to do.

As a matter of policy, I think it unwise for officials to ask for war bonuses sectionally, and think united action by an association such as the N.A.L.G.O., which represents all classes of officials, is the right course to adopt.

This is the policy my colleagues and myself have agreed to adopt, and we naturally feel very indignant at finding "the pitch queered" in the way this letter has done.—Yours, &c.,

Surveyor.

October 8, 1918.

"BITUMINOUS ROADS."

To the Editor of The Surveyor.

Sir,—In the paper "Tar Macadam and Tarred Slag," read by Mr. W. Jenkinson at the Chester meeting of the Quarry Managers' Association, I note from the report of this in your last issue that tar macadam and tarred slag are both referred to in connection with the construction of what Mr. Jenkinson describes as "bituminous roads."

In my opinion this is misleading, as a bituminous road is generally understood to contain bitumen. Tar macadam and tarred slag are too well known to need description, and it would be interesting to hear some of your readers' views on the subject.—Yours, &c.,

Macadam.

October 7, 1918.

MUNICIPAL WATERWORKS ASSOCIATION.

ANNUAL MEETING AT BIRMINGHAM.

The membership of the Municipal Waterworks Association—the seventh annual general meeting and conference of which was held at Birmingham on Friday last—now embraces sixty-three municipal water authorities, numbering 182 representatives and individual members. The association represents a total capital expenditure up to March last of £123,470,000, and the population supplied by the various authorities approaches 21,000,000 persons. Of the sixty-three water authorities represented on the association 49 are in England, 10 in Scotland, 3 in Wales, and 1 in Ireland. As regards the sources of supply it is interesting to note that 6 or 7 authorities are mainly dependent upon rivers, 12 obtain their principal supply from deep wells and boreholes, and the others derive their supply from upland gathering grounds by gravitation, and some partly from impounding reservoirs by gravitation and partly from deep wells by pumping.

Alderman J. H. Lloyd, the president, occupied the chair at the opening of last week's meeting. A welcome was extended to the members by the Lord Mayor (Sir David Brooks), who, in the course of his remarks, said it was a question whether the time had not come for the Government to exercise some control or authority over the water supply of the country, so as to secure for each town and district an adequate quantity based on population at a reasonable cost. They knew the way water schemes had been promoted in the past. Large watersheds had been secured at enormous cost, but a certain number remained, and it appeared to him it would be wise if there were some superior authority which could decide in which way the remaining water resources of the country could best be utilised for the benefit of the nation.

A paper on "The National Control of Watersheds and other Sources of Water Supplies" was subsequently presented to the meeting by Mr. C. G. Henzell (Leeds), and in another contribution Mr. J. Parry described what had been done in the matter of afforestation by the Liverpool Corporation around Lake Vyrnwy and at Rivington, near Bolton.

Women as Scavengers.—A report states that, "as a result of difficulties experienced," women scavengers have been dispensed with by Staines Urban Council.

The National Control of Watersheds and Other Sources of Water Supply.

By CHARLES G. HENZELL, M.INST.C.E., Waterworks Engineer, Leeds.

[Memorandum submitted at the Annual General Meeting of the Municipal Waterworks Association held at Birmingham on Friday last.]

I bring this question before the Municipal Waterworks Association because I feel that the time has come when we should give it our careful consideration.

It is not, in my opinion, a subject for individual action, but is one eminently suitable for the association to deal with, in order that we may by joint action prepare and put forward, at the proper time, a practical scheme based on sound commonsense ideas that will protect and help water undertakers who might otherwise be hardly hit or harshly dealt with by future proceedings and Acts of Parliament framed by those not so well equipped by training and experience in providing and carrying out water supply schemes, and the legislation suitable for such a purpose, as are the members of this association. There is no doubt but that in the near future the Government will take up the question of the allocation of the remaining watersheds or gathering grounds throughout the United Kingdom and especially those in England. In view of this, is it not time that we consider this subject with the purpose of formulating a scheme that will have weight with the Government or whosoever they may appoint to deal with it?

Nationalisation of water supply is not such a straightforward problem as the nationalisation of electricity or gas, or the laying down of tramways. Water schemes usually provide for a wide district; there are geological conditions and engineering problems to be considered, the question of rainfall, gathering grounds, water rights in rivers, and the vexed question of underground waters, &c.

Up to very recent times, "might" has been "right" in the acquisition of sources of supply, and where a large authority has gone to Parliament for powers to construct impounding reservoirs, sink boreholes, or otherwise abstract water, the powers have been granted to them often with little consideration for smaller authorities who have in some cases quite as good, or perhaps a better, right to the water, or at least to a portion of the yield.

A good supply of water is of vital importance both to the well-being and the trade of communities, whether they be large or small, and as time goes on more water will be required per head of the population as the benefits of more hygienic and sanitary conditions are better understood.

There are to-day many authorities who have nearly come to the end of their present resources and are looking out for a further supply. These further supplies cannot, in most cases, be found within their "home" gathering grounds, and it will probably mean their having to go long distances to other areas and supplies for which some other authority (or authorities) may have as good or a better right.

It is obvious that an authority that has an abundance of water, having looked ahead and provided for the growing demands of the future, will not be anxious to throw that surplus into a common stock. In providing for such water, heavy initial expenditure will have been made for the whole of the land and wayleaves necessary for a comprehensive scheme of which portions of the works may have been constructed, while only a small instalment of the full yield of the scheme is being used. The cost of the water at this stage is much greater than it will be when the works are complete and producing revenue at, or near, their maximum yield, and if any other authority comes for a portion of the water, the proper proportion of the expenditure incurred should be taken into account in arriving at the price to be paid.

In the thickly populated parts of the country nearly all the best and most accessible areas are now taken up, and those remaining are either not so good—geologically or otherwise—or their distance from the point of consumption renders them costly to authorities requiring a further supply, and to make use of such would mean heavy expenditure and skilful engineering, with the cost so excessive that it might seriously cripple the resources of the community.

The question arises, On the Government making this a national matter, would they levy an equal rate on all communities like the income-tax? Some supplies naturally cost more than others, and it may appear that some communities should have to bear additional burdens which enlarge the cost of producing their manufactures, thus hampering them in competition with manufacturers in towns where they have the benefit of a naturally cheap water. In revising the charges for water, the effect of costly water on the trade of a community has always been taken into consideration, and the charge made for manufacturing purposes is invariably made as light as possible.

This question of the National Control of Water Supplies is therefore of the utmost importance to the association, and will affect the authorities represented therein in many ways.

As an association representing the bulk of water undertakers, we cannot afford to stand by and let others take up this important question, and the following are some of the main points in our favour:—

(1) Members are naturally interested in the water supply to their own authorities.

(2) The association is representative of practically the whole of the large water-supplying authorities in the United Kingdom.

(3) There is, in my opinion, no body of representatives who have the knowledge and experience of this subject that is held by the members of this association.

(4) I think it imperative that we should take up this question. In doing so we would be in a position to prepare the way, help, and advise the Government by reason of our acquaintance with the needs and the scope of such a scheme, and at the same time safeguard the interests of water undertakers, both large and small.

(5) It would be almost impossible for a single individual to deal successfully with this question, but I consider that it can be well done by the association, somewhat on the following lines:—

(*a*) By the setting up of a committee of members who have experience in the survey of sources of water supply, catchment areas, boreholes, wells and rivers, the impounding of water, its distribution, and the general requirements of a water supply.

(*b*) This committee to be responsible for the division of the country into suitable sections, so that each could be surveyed and reported upon in a practical way.

(*c*) The committee would appoint sub-committees for each section or district, such sub-committees to co-operate with the most practical and experienced men of the district, who would be able to help and advise.

(*d*) The duties of the sub-committee would be to prepare and map out their districts and report upon: (1) All occupied watersheds. (2) All unoccupied ditto. (3) Rivers and other sources of supply.

(*e*) They would also report as to the authorities within their districts requiring a supply of water: (1) Immediate needs. (2) Future requirements. (3) As to the allocation of sources.

(*f*) The committee would consider the reports of the sub-committees for the various districts, and with their help would draw up schemes for the allocation of the available sources.

In putting this before you in the way I have done, I am not prepared to say that the plan I have outlined is the best method, but it at least provides a basis for discussion and the possible formation of a scheme that the association may with confidence put before the Government.

FUEL AND LIGHTING PROBLEMS.

ANSWERS TO QUESTIONS THAT HELP.

The following official replies to questions put to the Coal Controller will help others similarly situated:—

Q. Is it necessary for schools to fill in requisition forms?—A. Yes; although the Controller has announced that elementary schools are not to be rationed, requisition forms must be filled in so that local fuel overseers may satisfy themselves that there is no extravagance.

Q. Has a coal merchant to register as a customer?—A. Yes.

Q. Where a caretaker supplies coal for all the offices in a building, is it necessary for him to take out a licence as a coal dealer?—A. Yes, unless the supply of fuel is included in the rent of the offices, or otherwise arranged by the local fuel overseer.

Q. Need a small shop be specially assessed?—A. No, if the tenant resides on the premises.

Q. In the case of a partially completed building, does the owner register for the rooms already completed or the total rooms in the building when finished?—A. For rooms completed, furnished and occupied only. A supplementary application for the remainder of the rooms can be made later on.

Q. Can a consumer who is trying to secure a house and is at present in a hotel register later on?—A. Yes.

The Institution of Municipal Engineers.

ITS ACTIVITIES AND GROWTH DURING THE DECADE 1908—18.

By B. WYAND, Secretary of the Institution.

The expiration of the first decade of the existence of the institution seems a fitting time for a brief review of its history. There were few who thought in May, 1908, the position to which it would attain or the membership roll which it would amass. It started amid the most humble surroundings, and its earliest meetings were held in a room hired at the Bedford Hotel, Southampton-row. It now has members in every quarter of the globe.

EARLY DAYS.

Its opening days were ones of struggle, despite the fact that it leaped quickly into popularity. The Press (for reasons possibly not even known to themselves) were opposed to its formation. Their record of its proceedings was of the briefest, and no attack upon it was too virulent for publication. Still, that is past and over now, and there is no need to dwell upon such an unsavoury feature. My only point in mentioning it is to prove the fallacy of attacks of that nature. Persecution is ever a source of strength to the persecuted. To us it was a form of free advertisement in the literary columns, and we had always the very best positions.

FULL REPRESENTATION OF THE PROFESSION.

Until the formation of the institution there was no body fully representative of the profession. The term "municipal engineer" was restricted in its application, and there existed anomalies which were absurd upon their very face. The fact had not apparently been grasped that gas, water and electrical engineers were as much entitled to the designation "municipal" as was the surveyor of highways. The importance too of the work performed by the sanitary engineer was unrecognised, and no distinction was made between the inspector of nuisances and the official who controlled the whole of the sanitary work of his district. But the greatest anomaly lay in the classification of chiefs and assistants, the chief of an urban district of, say, less than 1,000 population (having control possibly of three miles of roads and a couple of sewage tanks) ranking above the deputy or the first assistant of a town or a city of the highest importance.

In the face of much outside scorn and contumely the institution set to work to remove these solecisms. It admitted to its ranks all degrees and classes of engineers who could furnish proof of their municipal experience and technical qualifications. In the second year of its life, in the course of a Board of Trade inquiry at which it was represented, it was urged against it that it admitted without examination, and this ridiculous plea was entered by a body which had run considerably over half a century before it thought of holding an examination.

THE QUESTION OF CLASSES.

The founders of the institution were believers in one class and one class only, and it is an open question now whether duplication and triplication—there are even advocates for quadruplication—is in the best interests of the profession. An institution must be more than a mutual admiration society if it is to be of any real use. It is all very well and very gratifying to grace a row of benches and listen to the reading of learned papers by men who have attained a certain degree of eminence in their profession. It is of undoubted interest and utility to visit the works of brother engineers. But there always remain the rank-and-file whose means do not allow them to travel far afield—the men who are in receipt of salaries that are a disgrace to our boasted system of local government. These men have a first call upon an institution, for the material prosperity of its humblest members claims priority over the mental development of the relatively affluent. To mention the word "union" is more than one dare in the face of existing prejudice.

GRADING BY EXAMINATION.

It must be understood that any views I may express are entirely my own, and I do not hesitate to say that I believe firmly in the one class for those admitted by election. If there is to be a higher grade, admittance to this should be by an examination test after the expiration of a certain probationary period. This would be in contravention of all accepted principles, for in most institutions examination admits to the lower classes, the upper being reserved for those who, being either unwilling or unable to pass the test, scour the country for names and jump in over the heads of the qualified but lower-graded men. Such a system is both absurd and unfair.

THE INSTITUTION EXAMINATIONS.

The institution examinations are purely optional, and much opprobrium has been heaped upon them by those who should know better. They are conducted on the only lines possible to ensure a test of knowledge, but they offend preconceived opinion and have committed the deadly sin of originality. They do not conform to existing custom and prejudice, and the nonconformer (I use the term to avoid confusion with nonconformist) is always viewed with suspicion.

The institution examination allows the candidate to bring his library into the examination room and to consult it as he pleases. The engineer is not in his daily work debarred reference to his books any more than is the doctor or the lawyer, and the practice of swotting up tabular matter and formulæ solely for examination purposes is a sad waste of mental energy. The soundness of the institution test has been fully endorsed by a most eminent board of examiners, for these gentlemen would never have given their services had they held the least doubt upon the matter. The questions which have been set form problems which would arise in everyday practice, and do not necessitate abstruse memorisings and crammed illogicalities. A student does not enter the room as a goose stuffed with ill-digested food and ripe for the slaughter.

CONSTITUTION OF THE COUNCIL.

The constitution of its council is another of the innovations of the institution. Here again it was recognised by the founders that the council must be representative of its members. The point need not be laboured, and it will suffice to say that elections are by ballot of all corporate members, and that, although the council nominate the president, vice-presidents and hon. treasurer, these have all to seek election, and any name may be erased from the ballot paper and another substituted. Personally, I see but one fault in the method of election, and that is that it is not fully representative. There seems no reason why the student class should not be allowed a seat or two upon the council.

DISTRICT COMMITTEES.

The progress made by the institution has been materially assisted by its policy of decentralisation. The country has been divided into districts, and each district is practically self-governing, with direct representation on the council through its chairman, who does not have to seek election by ballot, his seat being of an *ex-officio* nature. Establishment expenses of the districts are borne out of the institution funds. The war alone is responsible for limitation of district activities, the difficulty and expense of getting meetings together in scattered areas being almost insurmountable. Meetings *are* held, however, and interest maintained in other ways.

INCORPORATION.

The question of incorporation has been before the members recently, and opinion is in favour of such a step, although it is felt that the present is not an opportune time for an application. There is certainly some advantage in incorporation, although if freedom from Board of Trade restrictions could be maintained there would be gain in many ways. The Board of Trade is essentially one of those bodies that is hidebound by custom and precedent. Innovation is anathema to it, for innovation is apt to recoil on the head of the innovators, and this might mean the clearance of a host of superfluous officials. A specimen of its faithfulness to tradition was given recently in the refusal of the application of a certain body for the establishment of a compulsory defence fund. The institution is exempt from any such harassing restrictions. It can run upon its own lines and shape the policy it deems best for its members. Hence it has been able to establish a defence fund.

MUTUAL AID AND DEFENCE FUND.

This fund is administered by a special committee, known as the Board of Professional Defence, and has been established for the purpose of "mutual aid and defence." Subscription to it is compulsory on the part of home members and students, and moneys received are banked in a separate account. As proof that the fund is not aggressive, contentious or litigious in its nature, it may be said that many cases have been before it, and in none has resort to any action of a legal nature been found necessary. It has so far been a dispenser of advice, and its banked subscriptions remain intact.

SUPERANNUATION AND SECURITY OF TENURE.

Superannuation and security of tenure are the hardest nuts that the institution have to crack, and it would almost seem that reformation of the Local Government Board must come first. It is well known that the only way to move a Government Department is to push it, and that the harder the push the bigger the move. When sloth and inertia are present in an aggravated form, a push of a "perditionary" tendency is the only cure.

SURVEYORS AND THE LOCAL GOVERNMENT BOARD.

The relations between surveyors and the Local Government Board are certainly of a peculiar nature. The board does not apparently trouble itself much about the surveyor. His interests are nothing to it, and it will take no steps whatsoever in his defence The Sevenoaks appointment (for particulars of which I would refer members to the Annual Report of Council) clearly proved that. And yet the surveyor holds the board more or less in awe and respect. He regards it as a superior authority. Threats of its interference will produce strange symptoms. Clearly if the board will do nothing for surveyors, surveyors should do nothing for the board. I am not suggesting that any such seditious steps should be taken. I am only presenting things from a logical standpoint.

COMBINATION *v.* UNION.

Surveyors may be absolutely certain that no amount of appeal to the board will bring about either superannuation or security of tenure. The only appeal possible of success is an appeal to *force majeure*. The hand of the board must be forced, and for this there must be full combination (not "union," of course; that would be too ungentlemanly!) of all bodies representing the profession. Amalgamation of interests need not necessarily mean pooling of funds and merging of identities. Two separate and distinct bodies can surely work to a common end for the common good. The Local Government Board was, I believe, formed as a poor-law body, and surveyors do not expect the class of treatment meted out to refractory paupers. I feel that the possibilities would be immense had I the strength of the profession behind me.

MILITARY CONTROL AND OTHER MATTERS.

But superannuation and security of tenure are not the only matters demanding action, and the institution has taken steps in many other directions. They have protested strongly against the setting up of a Military Control of Roads, and have asked for representation upon the various transport boards and committees that have been formed. They have taken a strong attitude in connection with the appointment of fuel overseers, representing to the controller that these posts should be given to the engineer or surveyor to the local authority (as recommended by the controller himself) and not, because the appointments are paid ones, conferred upon other officials, or even upon councillors themselves. The payment of war bonuses to municipal officials has been urged in a circular letter sent to all borough, urban and rural district councils throughout the country, and this appeal (the first of its kind) has met with a generous reception by the authorities, and has resulted in the granting of bonuses (many up to the Treasury scale) in scores of instances.

THE "SELECTED" LIST.

Among problems yet remaining to be tackled, although preliminary steps have already been taken as regards some of them, are the meagre salaries paid to the majority of surveyors; the necessity for protection by, and the right of appeal to some higher authority (not necessarily the Local Government Board), and the amendment of the existing method of filling appointments. There are many scandals in connection with this last-named which call for attention. The "selected" list is only too often a delusion and a snare, being prepared merely to silence criticism, the appointment being virtually filled, and only awaiting formal confirmation. It is felt, too, that fitness to discharge the duties of the office should be a *sine quâ non* in all appointments, and that the salary should be stated by the local authority and not by the applicants. It is undignified in the extreme to put these posts up to a sort of Dutch auction. A lot of the trouble arises from a lack of appreciating the importance of the office of surveyor, and local authorities need educating up to the fact that a surveyor is their technical adviser, and not merely a clerk or a foreman to carry out instructions.

THE CONFERMENT OF HONOURS.

There are numbers of other matters engaging the attention of the council, who have consistently worked for the welfare of the members and students of the institution as a whole. They have worked harmoniously, too, and broadmindedly, and have always held in view the man who has small chance of helping himself, and whose nest is in the making and without so much as a single feather. In the conferment of the honours which the institution have to offer, in the way of nominations for a vice-presidency, they have always endeavoured to select the man who has done the most work—not necessarily the man who has attended the most meetings, but he whom they feel has been most active in the promotion of the general welfare. A man need not be a "big" one in the professional world to attain eminence in the institution.

A PERSONAL NOTE.

I feel that I have failed somewhat lamentably in writing up to the title of my subject as announced in the annual meeting programme, and that I have perhaps let myself go with a freedom that is only too customary with me. I might read carefully all I have written, and make copious emendations and deletions, and read it yet again and make further emendations and deletions, and on a third reading I should probably find it necessary to pad it out in order to shape it into something like a presentable whole. I have decided therefore to let it stand as it is, in the assurance that the members who know me best would be the first to deplore the issue of such an emasculated document, and in the hope that those members to whom I am unknown except by name (and a confirmed habit of sending out subscription applications) will be able to form some conception of the attitude I hold in regard to the needs, the responsibilities and the rights of the profession.

ANNUAL MEETING AT SOUTHALL, MIDDLESEX.

The tenth annual general meeting of the Institution of Municipal Engineers was opened at Southall, Middlesex, on Wednesday morning, when Mr. Reginald Brown, M.B.E., M.INST.C.E., M.I.MECH.E., F.S.I., F.R.SAN.I., the engineer and surveyor to the urban district council, was installed as president for the ensuing year. The proceedings opened with a reception of the members by Mr. A. Laurence Holder, the clerk to the council, the chairman of the local authority, Mr. W. Cantwell, J.P., being unexpectedly prevented from attending. Mr. Frank A. Pratley, vice-president, occupied the chair at the outset. Acceptances for the meeting included the following, viz.: Messrs. F. A. Pratley (Epsom), H. C. H. Shenton (London), E. Percival Mackay (Romford), H. C. Ridge (Romford), A. Paterson (St. Faiths), W. H. Reed (Greenford), G. B. Chilvers (Buckingham), J. Brook (Stratford-on-Avon), C. B. Machin (Alcester), L. Foster (Flitwick), W. E. Coles (Stratford-on-Avon), W. Plumpton (Barnet), J. W. Riggs (Hertford), R. W. Barlow (Brighouse), E. A. Stickland (Windsor), S. Simcox (South Mimms), G. A. Penwill (Peterborough), A. J. Elsom (Penge), E. S. Whaley (Berks), W. J. Coleman (Cookham), A. J. Redfern (Honiton), H. Boot (London), D. C. Fidler (Hayes), E. Pollard (Leighton Buzzard), T. Clayton (Berks), and F. L. Reynolds (Buckingham), members; G. J. Rich (Romford), J. Craig (Hornchurch), G. W. Chilvers (London), O. L. Browne (Bedford), F. W. Walker (Ampthill), A. J. W. Pearson (Barnet), A. J. Morford (Barnet), G. F. Hemming (Hertford), A. Thomas (London), H. C. Perry (London), A. E. Guttridge (Peterborough), H. C. Mylne, J.P., Mayor of Wokingham; J. H. E. Clifton (Wokingham), J. G. Paterson, M.O.H. (East Berks), T. A. Saunders (Maidenhead), A. E. Nichols (Folkestone), R. Forsyth (Folkestone), H. Tooley (Buckhurst Hill), C. Brown (Edmonton), W. W. Cooper (Slough), A. L. Grant (High Wycombe), E. Chapman (High Wycombe), E. Morley (Walthamstow), J. E. Hattersley (Eton), G. Goosney (Southall), R. A. Glen (Temple), F. Wood (Fulham), J. Blizard (Southampton), F. H. French (Harwich), N. Scorgie (Hackney), M. Hainsworth (Teddington), A. C. James (Grays), E. Willis (Chiswick), F. T. Clayton (Reigate), R. Ames (Nottingham) and H. C. Phillips (Ongar), visitors.

The minutes of the last general meeting were read and confirmed.

COUNCIL'S REPORT.

A report of the council covering the period from July 1, 1916, to September 30 last was submitted. This stated that on June 30, 1916, the roll of the institution stood at 827, consisting of 662 members, 125 associate members and 40 students. On September 30th last the roll was 852, consisting of 700 members, 118 associate members and 34 students.

As is well known, the council have expressed their preparedness to consider favourably the question of forming one professional body to represent municipal engineers, and certain representations upon the matter were made to the Institution of Municipal and County Engineers, as a result of which that institution had appointed a committee of their council to confer with a committee of the Insitution of Municipal Engineers, and a first meeting was being arranged.

The report recalled that in May last a circular letter, setting forth the Treasury scale of war bonuses, was sent to all borough, urban and rural district councils throughout the country, with an expression of hope that such scale might be adopted by the local authority in the case of their officials. The result had been in the highest degree satisfactory, scores of councils having, in response to the appeal made, granted a war bonus to their surveyor and other officials.

The report mentioned that while a number of members on active service were paying their subscriptions with customary regularity, there was a large proportion who, from various causes, were unable to meet their liabilities in this direction. The council wished it to be clearly understood that no pressure for payment was put upon any member. The matter was one for the individual, and on the termination of the war the whole of the cases would be gone into, and subscriptions in arrear

would be remitted as necessary. Several cases had already arisen of members discharged from the Army, and in every such case the areas accrued during service had been remitted, the members starting with a clean sheet.

It was added that the Roll of Honour, embodying the names of corporate members and students of the institution who were known to be on active service, now contained 259 names.

THANKS TO RETIRING PRESIDENT.

On the proposition of Mr. E. A. Stickland (Windsor), seconded by Mr. H. Boot (London), a vote of thanks was accorded to the retiring president, Mr. E. Whitwell, a similar compliment being paid to Mr. Pratley for his services as deputy-president during Mr. Whitwell's absence in America.

The secretary next announced the result of the ballot for the council for the year 1918-19, and a number of apologies for non-attendance having been read, Mr. Reginald Brown was formally installed as president.

PRESIDENTIAL ADDRESS.

Mr. Brown said he did not desire to traverse work done in the past; he wished to take a glimpse into the future and bring before them some of the problems which would have to be dealt with "after the war," and which would materially affect municipalities and their officials. The problems arising out of the war were many—national and local—and they must be ready

Mr. Reginald Brown,
The new President of the Institution of Municipal Engineers.

to put into practice the solution for the betterment of the people of this country. Continuing, Mr. Brown said:—

The local government system of this country may be likened to a wheel whose hub is the central authority round which all authorities revolve, and from which radiate the spoke of the county authorities surrounded by the "felloes" of borough, urban and rural district councils—all bound together by the tyre of restrictive, unyielding and sometimes obstructive legislation. As the tyre of the wheel sometimes requires remodelling to suit the surfaces over which it travels, so the law of local government requires remodelling to suit the times in which we live. There needs to be more elasticity in its application as to better adapt itself to the varying needs of the people. One of the "after-the-war" problems will therefore be the widening of the powers of local authorities, so as to give them greater freedom of action in carrying out the wishes of the people of their districts without interference from any central department, or only such interference as will prevent any action taken adversely affecting the interests of the country generally. This, of course, means a re-modelling of local government, and there is no doubt that after the war we shall see a general devolution of power from the central body, a dividing up among smaller units of the powers now exercised by Imperial Parliament.

RATING.

An address from a municipal engineer to municipal engineers may by some be thought not to be an appropriate occasion for dealing with this question, as municipal engineers have had very little to do in the past with the methods of raising the money from local taxation. . . . One of the after-the-war problems will no doubt be the revision of the present system of local taxation so as to secure payment from thousands who now escape for the simple reason that they are not householders, although they enjoy the privileges and benefits conferred by the expenditure of rates provided by their less fortunate brothers. The time has arrived, and is becoming more apparent every day, that mere house rent cannot be regarded as a fair test and measure of ability to bear local burdens, and if housing, for instance, is to be carried on to the extent required the measure of ability for a man with a large family to pay rates must not be gauged only by the size of the house he occupies. The production of children—which after all is for the benefit of the State—should not mean that the man himself should be penalised by payment of more rates—he has a sufficient taxation in the extra cost of the bringing up of his family.

HOUSING AND TOWN PLANNING.

The problems of town planning and housing will require all the skill and ability of municipal engineers to be brought into play if the proper solution is to be obtained. . . .

The land being in the hands of private owners, and those owners being permitted an Englishman's privilege of doing what he desires with his own, has led in the past to those haphazard developments deplored by all right-thinking men; but this is not the fault of the landowners altogether—it is the fault of the system. Unless definite lines are laid down upon which a district must be developed, human nature is such that, although nine-tenths of landowners may be prepared to put the public needs before private gain, the remaining one-tenth may spoil the whole plan. If a district is to be developed properly there must be one coherent plan to which all landowners must conform, and from which no one must be permitted to depart if such departure is detrimental to the remainder. In the first place there must be greater trust between the parties interested in town planning, and hence there must be greater co-operation. I for one believe that it is in the interests of landowners themselves to co-operate in the matter of town planning; but, on the other hand, there must be elasticity of application after a plan is agreed upon, as a town plan made now may not be carried out wholly for the next hundred years, and provision should be made that the altered needs of the times at which the actual developments take place may be met. I feel sure that with this provision landowners would all the more readily agree on town-planning principles, and if with this there was some form of equalisation of charges, according to benefits received, there could be no reasonable and valid objection to any town-planning scheme. To obtain the powers to make a town-planning scheme the procedure must be very much simpler and much more expeditiously carried through than at present, and the carrying out of the scheme must be done in such a manner as not to increase, but rather to diminish, the ultimate rent to be paid by the occupiers of the houses to be hereafter erected, because the difficulty to be faced "after the war" will be how to provide a suitable house at an economic rent commensurate with the ability of the tenant to pay. . . .

ROADS.

No one can yet foresee the ultimate solution of the road and inland transport problem. There is much back work to be made up in the making and maintenance of the highways of the country, and there is no question but that they will be required to carry more inland transport than ever. The condition of the roads is an index to the prosperity of a country. Whether the present system of maintenance by dual authorities such as county and district councils continue, or whether the maintenance of the more important main thoroughfares shall vest in a central authority such as the Road Board, leaving purely local roads to be maintained by local councils, remains to be seen. Whatever is done it is essentially necessary there shall be no "square pegs for round holes," that materials shall be available in conformity with well-thought-out and equitable rules, both at the quarries and also in the means of transport.

MUNICIPAL TRADING.

The mere mention of this thorny subject is sufficient to frighten a good many people. That it is no new one is apparent from the huge sums of capital invested in commercial undertakings by local authorities throughout the country. There is, however, a good deal of distrust by the central powers of the capabilities of local authorities. Each of such undertakings has to receive special Parliamentary sanction if inaugurated as a commercial undertaking, and those acquainted with Parliamentary procedure know only too well the cost incurred. Certainly local authorities do carry on municipal trading in small ways without let or hindrance; but it is not possible for them, no matter how good a scheme may be or how much it is desired by a locality, to embark on such a scheme. If future ratepayers are to reap the benefits, the present generation should not bear all the cost; but this cannot be achieved without raising a loan, the repayment of which is spread over a number of years, and before a loan can be raised on the security of the rates a special Government sanction has to be obtained, and this sanction will not be given unless "statutory authority" already exists—*i.e.*, the purposes of the scheme must be those for which authority is given by statute to raise money by loan.

How can statutory authority exist for many things desired by and of necessity to the people unless and until those desires and necessities are recognised by Parliament? In a glimpse

into the future I can see local authorities having wider powers in this respect, when they will be held responsible for the comfort and well-being of the people of their own district, and will be permitted to do anything and everything vitally essential for the public good. This position will lead to a very different outlook on life—commercial undertakings require commercial minds, and in due time we shall no doubt see the position of town manager created, whose duty it will be to manage all municipal undertakings, with a view to getting the best results at the most economical expenditure for the benefit of the ratepayers. The future municipal engineer will probably be a man with not only a professional training, but also with a commercial training—a man who has not only the ingenuity to create, because that is the real meaning of the term engineer, but also the ability to manage successfully the things created. What a future to look forward to!

UTILISATION OF WASTE.

This in itself is the kernel of municipal trading, and if the activities of local authorities were allowed full play in this direction they could set a good example even to the authorities in Whitehall. Economy is in the air just now, and economy is badly needed. It is being preached throughout the breadth and length of the land, but economy cannot be practised by local authorities in many things unless they have "statutory" authority to economise. Preaching is all very well, but power to practise is by far the better. Still, with the limited powers local authorities now possess a good deal of economy might be practised, and we are at last waking up to the fact that in the past we have been a very wasteful nation, and it is time to take stock of our home resources, but local authorities must have wider powers if they are to exercise to the full the degree of economy they desire to practise.

I could deal at very much greater length with many other problems which will have to be solved by local authorities and their advisers, but I am afraid that already my address has extended beyond the usual length. It is certain that it deals with matters of import to others than municipal engineers, but in which municipal engineers are, or ought to be, and in the future will be, particularly interested.

I cannot, however, close my address without saying a few words about co-operation between officials of local authorities generally and our own profession in particular. I have no hesitation in urging all municipal officers to become connected with the National Association of Local Government Officials—individually and collectively—because it is to their interest to do so. So far as we ourselves are concerned, the time is ripe for a more hearty co-operation, and a merging into one of the various interests now prevailing. I urge you to work with me in this desirable aim, resting assured that, so far as I am personally concerned, the interests of the members shall be my first consideration, but to attain unity I am prepared to give much so long as our efforts to approach are met in the same spirit.

A hearty vote of thanks was passed to Mr. Brown for his address, and the secretary, Mr. Wyand, then presented a contribution—reproduced on an earlier page—descriptive of the activities of the institution during the decade 1908-18.

VISITS.

In the course of the afternoon an interesting round of visits were made by the members, among the places inspected being Messrs. Lowden's electric lamp works, trade waste purification and tin salvage operations at another factory, and a reinforced-concrete building in course of erection.

Yesterday (Thursday) visits were paid to the local sewage disposal works, the works of the neighbouring district of Hanwell afterwards being inspected.

Water Consumption in Canada.—Reporting on the increasing consumption of water in Hamilton, Ontario, Mr. E. R. Gray, the city engineer, states that the average pumpage, 127 imperial gallons per head per twenty-four hours, is considerably higher than the average consumption by American cities, and almost twice the consumption of cities where the services are metered.

1,400,000 Allotments.—The Food Production Department has collected particulars of the allotment movement in the county boroughs of England and Wales. In these particulars it is stated that of an estimated number of about 1,400,000 allotments in the two countries on May 1st of this year 261,000, or about 18 per cent, were located in eighty-two county boroughs. In these boroughs there is an average of one allotment to every nine households. In Burton-on-Trent, which is at the head of the list, there is one allotment to every two households; in Derby, Eastbourne, Gloucester, Leicester, Oxford, Southend-on-Sea, and Walsall there is one allotment to every three households; in Canterbury, Reading, Wakefield and York there is one allotment to every four households; in Carlisle, Croydon, Darlington, Stoke-on-Trent and Newport (Mon.) there is one allotment to every five households. Leicester is at the top of the lists for the largest aggregate area of allotments, with 1,539 acres; Birmingham comes next with 1,479 acres; and Sheffield third with 1,014 acres.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is it not evident that the question of roads is exercising the minds of all civilised nations when we find that the engineer superintendent of roads in Natal, in a recently issued report, submits proposals for the construction of 122 miles of new roads in that province, and the carrying out of other works in connection therewith?

* * * *

Is it not satisfactory to learn that the concrete roadway laid in Canmore-street, Dunfermline, in October, 1916, is in "perfect condition," and that not a penny has been spent on it in repairs or maintenance since it was tar-sprayed in the Spring of 1917? In view of the fact that this road carries a regular service of heavy omnibuses in addition to the ordinary traffic, does not this speak well for this description of construction?

* * * *

Does it not seem rather hard on the municipal surveyor that whilst he is hampered with a depleted staff, shortage of labour and other worries connected with the war, he should be inundated with questions and be asked to fill up forms sent to him by various Government departments? Have we not every sympathy with the surveyor of Ware, Herts, who recently informed his council that he had received a Government form, relating to after-war construction, that contained no fewer than 500 questions which he was expected to answer?

* * * *

Is it not rather interesting to see by the French paper *Technique Moderne* that France is considering the serious questions which will arise after the war in connection with road transport and in what way this greatly increased traffic is to be met? Will it be a surprise to English road engineers to learn that in order to meet this increased traffic it is considered that the American reinforced concrete methods of road making are to be given premier attention?

* * * *

Does it not seem a pity that the art of making cob walls (mud and straw) is dying out in this country, and is it not well that the Devonshire Education Committee have decided to form classes in order to revive it? Are not cob-built cottages, warm in winter and cool in summer owing to the non-conducting qualities of this material, exceedingly cheap in construction and immune from decay, and should not this form of construction be adopted in some localities where other descriptions of building materials are scarce and expensive?

* * * *

Could not more be made of moonlight nights in the way of saving artificial street lighting than is done at present? Although it is true that the moon is sometimes fickle, could not the slight inconvenience arising when the moon refused to shine be compensated by the great saving that would be effected, especially in rural districts? Is it not rather absurd that lamps should be lighted on a moonlight night, when we are all striving to save gas and electricity?

* * * *

Is it at all surprising that there is a growing feeling of protest against the reckless manner in which money is being spent by the Government in the erection of buildings and other works? Do not, as was pointed out at a recent meeting of the Montrose Town Council, the enormously high wages now paid by contractors for Government work divert labour and make it extremely difficult for local authorities and private firms to "carry on"? Although every excuse should be made for the urgency of work required for war purposes, could not the Government have been advised by experts with regard to their contracts so that this serious state of things would not have arisen?

Barry and Penarth Meeting.—Pressure on our space compels us to hold over our report of the recent meeting of the Institution of Municipal and County Engineers at Barry and Penarth.

Thornycroft Motor Vehicles.—Messrs. John I. Thornycroft and Company, Limited, have published a new booklet entitled "What Thornycroft Motor Vehicles have done for the Army from 1899 to the Present Year." The booklet, which is well illustrated, provides an excellent insight into the firm's activities during the period of twenty years with which it deals, and furnishes a good idea of the prominent part which the company have taken in the development of mechanical traction for military purposes. Several thousand Thornycroft vehicles are now in service with the army, and it is not too much to say that they have given the utmost satisfaction in every theatre of war in which they have been employed. Copies of this interesting little publication can doubtless be obtained on application to the company's offices at 10 Grosvenor-place, London, S.W. 1.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Bradford T.C.—A notice has been issued by the city engineer and surveyor (Mr. W. H. S. Dawson) asking owners or occupiers of premises having signs or other projections attached to or above their buildings to see that the fastenings are carefully examined, and, if necessary, repaired. Before the war these signs and projections used to be examined by inspectors from the surveyor's department, though it was really no part of the duty of the department. Now, however, the staff of the department is so depleted that trust must be placed on the sense of citizenship of the owners and occupiers of the buildings concerned.

Cardiff T.C.—The Property and Markets Committee considered a report by the city engineer (Mr. E. J. Elford) on the ventilation and heating system at the City Hall and Law Courts. The system, he said, was quite ideal on paper, but in practical working many difficulties arose. The total annual working cost was about £2,300, coal alone costing about £1,400, of which a considerable proportion was wasted. The system generally was, therefore, not only unsatisfactory in its results, but wasteful in its operation. It was agreed to recommend that £200 be allowed for experimenting with a view to improvements.

Chertsey R.D.C.—The West Surrey Building Trades Association wrote asking the council to see that quantities were provided in all cases over £500 in the preparation of estimates. The surveyor, Mr. H. Beeney, said the council had always worked on that principle, and it was decided to inform the association of that fact.

Guildford T.C.—Messrs. J. M. Rutter & Co., in connection with a proposed house at Aldershot-road, submitted plans for the construction of smoke flues with fireclay socketed pipes jointed with fireclay cement. The pipes will be encased in brickwork up to the top of the chimneypiece on each floor, and thence upwards would be exposed. As the floors and roofs are to be of reinforced concrete, the borough surveyor did not object to the proposal. There are, however, no by-laws applicable to floors and roofs so constructed, and while approving the plans the General Purposes Committee instructed the town clerk and borough surveyor, Mr. E. Y. Harrison, to make inquiries as to the use of flue pipes in other districts, and to submit by-laws governing the use of such methods of construction.

Manchester T.C.—As the Art Gallery Committee and the Libraries Committee have definitely decided that their requirements could not be met by the erection of a combined building on the Piccadilly site, the city council have abandoned the idea of having one building for library and art purposes, and have directed the payment to Messrs. Crouch, Baker & Savage (the authors of the selected design for the erection of a proposed library and art gallery on the site) of the sum of 500 guineas, the balance of the premium payable to them in accordance with the terms of the competition under which the design was submitted.

REFUSE COLLECTION AND DISPOSAL.

Barnes U.D.C.—The council are applying to the Local Government Board for sanction to a loan of £11,000, for the extension of the dust destructor, and also for £120 for the provision of a bath at the works.

ROADS AND MATERIALS.

Bradford T.C.—The Street Improvement and Buildings Committee recommended the purchase of various properties for road improvement purposes, including the purchase of the New Inn estate, required for the widening of Thornton-road, at a cost of £53,250.

Greenock T.C.—The town council are negotiating with Messrs. Caird & Co. for the sale to them of certain blocks of corporation properties for a shipyard scheme. The scheme will eventually involve the provision of new housing facilities in the area, a tramway extension, and the construction of new streets, including a new central thoroughfare 60 ft. wide.

Newport (Mon.) T.C.—It has been resolved to purchase properties at the corner of East Usk-road and Caerleon-road, at a cost of £2,000, for the purpose of a road improvement.

Norfolk C.C.—The county surveyor, Mr. W. W. Gladwell, reports that the work in connection with the upkeep of the main roads has been carried out during the quarter as expeditiously as the conditions prevailing relating to the shortage of manual and team labour and materials would permit. No time has been lost in the work appertaining to steam rolling, other than that in the harvest period. Seven rollers only are available for resurfacing (fourteen were formerly in use), and work of this character has had to be considerably curtailed, and in consequence it has been found necessary to a far greater extent than has been customary to resort to the undesirable method of carrying out repairs to road surfaces by extensive patching. Considerable timber haulage is in progress throughout the county, and from this cause, and other traffic of a heavy nature, deterioration of road surfaces is apparent in many instances. About one-fourth only of the quantities of granite allowed in the 1918-19 estimate are to hand, due to the reduced output in the quarries owing to labour shortage, and also to the restricted railway facilities and the dearth of team labour.

Nottingham T.C.—It is proposed to purchase certain properties for the continuation of the widening of Ilkeston-road.

Royton U.D.C.—In respect of the scheme for the repair of Shaw-road, the council have accepted the offer of £1,080 from the county council.

Uckfield R.D.C.—The Road Board have intimated that they have made application to the War Office for sanction to an expenditure of £3,667 on repairs to the Crowborough roads.

SEWERAGE AND SEWAGE DISPOSAL.

Houghton R.D.C.—Mr. Cowley raised the question of the wages of the farm manager. He thought that 50s. a week was not sufficient, having regard to the responsibility which the man had. The chairman explained that in addition to the wage the foreman had various privileges, and had expressed himself as being satisfied with an increase recently given.

Samford R.D.C.—A scheme for laying a new sewer at Shotley has been approved, at an estimated cost of £468, subject to a loan being granted by the Local Government Board.

WATER, GAS, AND ELECTRICITY.

Abergavenny T.C.—It was reported that there had been a loss of £1,446 upon the gas undertaking last year.

Belfast T.C.—In connection with the supply of plant for the new electricity station, the Electricity Committee have, on the recommendation of Sir John Snell, accepted tenders amounting in the aggregate to £203,109. These include the following: The British Thomson Houston Company, Limited, two 6,000-k.w. turbo generators, with condensing plant, &c., and one 300-k.w. balancer booster, £74,839; the Stirling Boiler Company, four 48,000-lb. water-tube boilers, &c., four fuel economisers, and two steel chimneys, &c., £82,516; Holden Brook, Limited, two electrically-driven boiler-feed pumps, £1,565; the Tudor Accumulator Company, accumulators, £4,414; Vicars, Limited, rotary converters, £30,613; Siemen Bros., static transformers, £9,162.

Cockermouth R.D.C.—The Local Government Board have written that they are unable to entertain the council's application at present for sanction to a loan to defray the cost of works of water supply in Bridekirk.

Exmouth U.D.C.—A proposal has been adopted for overhauling and cleaning the machinery at Dolton waterworks, at an estimated cost of £237.

Filey U.D.C.—The council have accepted the tender of Messrs. Drakes, at £310, for the provision of a new bed of six retorts in the new retort house at the gasworks.

Leeds T.C.—So far as the exigencies of the situation will allow, the electricity department state that they are willing to meet the growing demand for supplies of current; but it is pointed out that certain limitations have been imposed by the Ministry of Munitions, one of the principal of these being that no new household service may be provided where the cost of connecting the cable exceeds £10.

Mountain Ash U.D.C.—Last year's loss on the gas undertaking was stated to be £3,841.

Newport (Mon.) T.C.—The town council have finally agreed to proceed with the Talybont water supply scheme.

Stowmarket U.D.C.—On the advice of the engineer it has been decided to instal a second new set of pumps at the pumping-station in place of repairing two old sets, and also to effect other necessary improvements, involving an additional expenditure of approximately £300.

MISCELLANEOUS.

Chelmsford T.C.—It was stated that a firm was charging 50s. a load for wood which cost 35s. on August 31st. The town council are therefore asking the Government to fix maximum prices for wood.

Chertsey R.D.C.—The council sealed the agreement with the War Office settling the dispute as to the taking of gravel from Chobham Common, the chairman remarking that they had

gained a great victory, and the right of taking gravel was now secured for ever.

Haslingden T.C.—The Inspection Committee were informed that the borough surveyor had carried out work for the corporation while home on leave, and it was resolved that the borough surveyor be paid for any services he may render in the future under similar circumstances, and that he be also paid for the services rendered while on leave a few weeks ago, and that the amount to be paid to him be left in the hands of the Inspection Committee to deal with.

Itchen U.D.C.—The council have resolved to ask the sanction of the Food Controller to a scheme for the establishment of a national kitchen.

PERSONAL.

Mr. J. A. Iveson, surveyor to the Scarborough Rural District Council, has received a war bonus of £33 a year.

Mr. C. R. Spencer, surveyor to the Spennymoor Urban District Council, has been appointed local fuel overseer.

Mr. A. Percy Harcourt, temporary assistant to the borough surveyor of Deptford, has been appointed borough surveyor of Marlborough.

Mr. Reginald Brown, the new president of the Institution of Municipal Engineers, has been engineer and surveyor to the Southall-Norwood Urban District Council since 1901. His experience embraces almost every phase of municipal engineering. He received his training under the city surveyor of Peterborough, and his first appointment was as assistant surveyor to the Brentford Local Board. He was afterwards chief assistant to that veteran municipal engineer the late Mr. Charles Jones, of Ealing, with whom he remained for nearly seven years. He left Ealing on being appointed chief surveyor to the Metropolitan Vestry of Stoke Newington, but by the London Government Act his office was abolished. For a time he was contractor's engineer during the construction of the Brighton electric tramways, and, as before stated, was appointed to his present office in 1901. He is a member of the Institution of Civil Engineers, a Fellow of the Surveyors' Institution, a member of the Institution of Municipal and County Engineers and of the Royal Sanitary Institute, and an honorary member of the Association of Managers of Sewage Disposal Works.

OBITUARY.

Mr. Robert Robertson, surveyor to the Cleator Moor Urban District Council, died recently, we regret to state, aged fifty-four. He was appointed to the position in 1885.

Sir Walter Jerred, assistant secretary of the Local Government Board, died in hospital last Sunday at Modane, France, after an operation for appendicitis. Sir Walter, who was fifty-three years of age, entered the Civil Service in the Public Record Office, Ireland, in 1882, and was transferred to the Local Government Board, England, in 1897. He acted for some years as private secretary to Mr. John Burns, when President of the Board, and was appointed an assistant secretary of the department in 1910, receiving the C.B. in 1912 for his services in that position.

MOTORS AND MUNICIPAL WORK.

Southwark Board of Guardians have decided to purchase two motor ambulances for an aggregate sum of £450.

South Shields Town Council have agreed to purchase an Orwell electric tipping wagon from Messrs. Ransomes, Sims and Jefferies, for £1,045.

Tunbridge Wells Town Council have agreed to purchase a motor fire engine, with first-aid equipment and 55-ft. fire escape, at a cost of £1,335

Willesden Health Committee are making inquiries into the cost of garaging and charging electrically-propelled vehicles, which it is proposed to obtain for refuse collection.

Nottinghamshire Roads.—The county surveyor of Notts, Mr. J. C. Haller, reports that of the main road reconstruction scheme, largely assisted with Road Board grants, 88¼ out of 90 miles of rural main roads, and 20 out of the 24 miles of urban main roads have been completed, at a cost of £127,521. The average cost of the rural main road reconstruction was £1 072 12s. 4d. per mile. Out of the 321 miles of directly maintained main roads, 175 miles of Notts. are faced with tarmac. Last year 107 miles of Notts main roads were surface tarred, at a cost of 1·65d. per yard. Much damage has been done by timber haulage, the responsibility for some of which is accepted by the Treasury.

HOUSING NOW AND AFTER THE WAR.

GOVERNMENT GUARANTEES TO PUBLIC UTILITY BODIES.

On Friday last Mr. Hayes Fisher, President of the Local Government Board, received a deputation from the Federation of British Industries and the National Alliance of Employers and Employed on the question of housing after the war.

In his reply Mr. Hayes Fisher observed that the Public Utility Societies, in dealing with the provision of housing accommodation, were looking to the Government to find on loan 75 per cent of the capital required for the purpose, and the Government were looking to the societies to find the other 25 per cent, the same amount that would be found by the local authority. Many of the local authorities, he believed, welcomed the assistance of Public Utility Societies. What he wanted was for these societies to get into communication with individual local bodies. He had promised, on behalf of the Local Government Board, to help local authorities to build 210,000 houses. It had been suggested that the number should be 300,000, but he did not think this number could be built within a year after the war. Let them, however, build as many as they could. Not only was it a matter of houses, for equally important was the provision of tramways to connect the houses with the towns, while such questions as water supply and drainage were also involved. He proposed to obtain from Parliament an extension of Sec. 72 of the Housing and Town Planning Act of 1909 enabling county councils to take shares in Public Utility Societies or make loans to them so as to include all local bodies. There was a great opportunity before them, and Public Utility Societies could rely upon the Government supplying 75 per cent of the necessary capital. They would not be given better terms than those granted to local authorities, but they would receive treatment as favourable.

Newport (Mon.) Town Council have agreed to purchase sites at Maindee Hall and Maindee Park, at a cost of £17,000, for the purpose of housing.

Llandudno Urban District Council have purchased a site at Maesdu for the erection of workmen's houses, and the Local Government Board are being asked to sanction a loan of £1,850, the price of the land.

St. Helens Health Committee have decided to abandon their housing scheme, which was decided on in 1814, and to acquire if possible three new sites for a housing scheme on garden city lines.

Filey Urban District Council have given instructions for the preparation of a sketch plan showing how part of Scarborough-road allotments field could be laid out for the erection of houses on a scale of eight houses to the acre.

Termination of a Bilston Action.—The plaintiffs in an action against the Bilston Urban District Council have given notice of discontinuance, and the council applied for costs. The action was in respect of the alleged flooding of mines from the council's sewer. The council contended that there was not the slightest ground for the contention of the plaintiff, and this has since been overwhelmingly borne out by expert evidence. The council's costs were delivered at £651, and these had been taxed at £400, which has been paid. It was stated that the threatened claim had caused a great amount of work to the council, and that Mr. V. Turner, the surveyor, who now holds an important position in France, had to be recalled to Bilston twice.

FOR OTHER ADVERTISEMENTS
See End of Paper.

ROAD FOREMAN, &c., wants appointment. Fully experienced.—Box 1,670, Office of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4. (3,889)

BOROUGH OF MIDDLETON.
SURVEYOR'S CHIEF ASSISTANT.

The Town Council invite applications for the position of Temporary Chief Assistant and Draughtsman in the Borough Surveyor's Department, at a salary of £150 per annum, including War Bonus. Applicants must be ineligible for military service. Applications should be made in candidate's own handwriting, stating age, qualifications, and experience, should be accompanied by copies of not more than three recent testimonials, and should be marked "Surveyor's Assistant," and forwarded so as to reach me not later than 2nd November, 1918.

J. P. WALMSLEY,
Town Clerk.

Town Hall,
Middleton. (3,890)

A LABOUR-SAVING DEVICE.

In the "Dumore" hold-open sack supporter, particulars of which appear in our advertisement pages, the Canadian-American Machinery Company, Limited, of 6-8 Bouverie-street, London, E.C. 4, have added another time and labour saving device to their already long list of helps to win-the-war introductions. Their sack-holder's efficiency is only surpassed by its extreme simplicity.

A sack can be instantly suspended open-mouthed and is held secure in that position by the outward spring of the two uprights while being filled. The tautness of the grip on the top edge of the sack increases with the increased weight of the sack being filled, yet when full the sack is instantaneously releasable. The holder is in one piece, no bolts, nuts, or adjustments being necessary, and it could be dropped from one floor to another or left out indefinitely in all weathers without materially affecting its efficiency. The weight of the heaviest pattern is little over 14 lb., while for stowing away or for transport purposes it permits of nesting together, so that a dozen to twenty-five occupy little more space than a single apparatus.

Doing away as it does with the labour of the man often employed in holding the sack open and in a convenient position for filling by a second person, the claim that this apparatus saves its cost in the first week seems well founded, yet its durability and efficiency should ensure it a very big field at home and abroad or wherever there is grain, cement, lime, sand, coal and coke, waste paper, sawdust, metal and cloth chippings, cut lawn grass, leaves, market garden or farm produce to be bagged single handed. To see and test this device is to believe and employ it.

Closing Municipal Kitchens at Liverpool.—At Liverpool City Council last week, the closing of four municipal kitchens was announced, over £2,000 having been lost on them. Other kitchens are being continued.

Grants for Municipal Employees.—The Local Government Board have written to the Doncaster Town Council with reference to the proposal to provide a fund making grants to corporation workmen after twenty-five years' service, or on attaining the age of sixty-five, stating that the board were aware of no authority under which such a fund could be constituted.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

SURVEYOR AND SANITARY INSPECTOR.—October 14th.—Penrith Urban District Council. £230 a year.—Mr. G. Wainwright, clerk, Town Hall Penrith.

ENGINEERING FITTER.—October 14th.—Gosport Urban District Council.—The Surveyor, Urban Council Offices, Hants.

ARCHITECT.—October 26th.—Rotherham Town Council. £500 a year.—Mr. Chas. L. des Forges, town clerk, Town Hall, Rotherham.

SURVEYOR AND INSPECTOR.—October 18th.—Cleator Moor Urban District Council. £250 a year.—Mr. H. Rothery, clerk, Cleator Moor, Cumberland.

SURVEYOR AND INSPECTOR'S ASSISTANT.—October 18th.—Newmarket Urban District Council.—Mr. W. H. Eley, engineer and surveyor, Town Hall, Newmarket.

TEMPORARY WATER INSPECTOR.—October 22nd.—Loughborough Town Council. 38s. per week, with 7s per week plus 10 per cent war bonus.—Mr. Albert H. Walker, borough surveyor and water engineer, Town Hall, Loughborough, Leicestershire.

SURVEYOR'S CHIEF ASSISTANT.—November 2nd.—Middleton Town Council. £150 a year.—Mr. J. P. Walmsley, town clerk, Town Hall, Middleton.

CHIEF ENGINEER.—October 25th (in England), December 10th (in Calcutta).—Calcutta Corporation. 2,000-2,500 rupees per month.—Mr. S. W. Goode, c/o H. S. King & Co., 65 Cornhill, London, E.C. (for England), and the Secretary to the Calcutta Corporation, Municipal Office, Calcutta (for Calcutta).

CONSULTING ENGINEER.—Union Government of South Africa.—The High Commissioner for the Union of South Africa, 32 Victoria-street, London, S.W.

SANITARY INSPECTORS.—Medical Department of East Africa. £200-£250, with a uniform allowance of £10.—The Crown Agents for the Colonies, 4 Millbank, London, S.W. 1.

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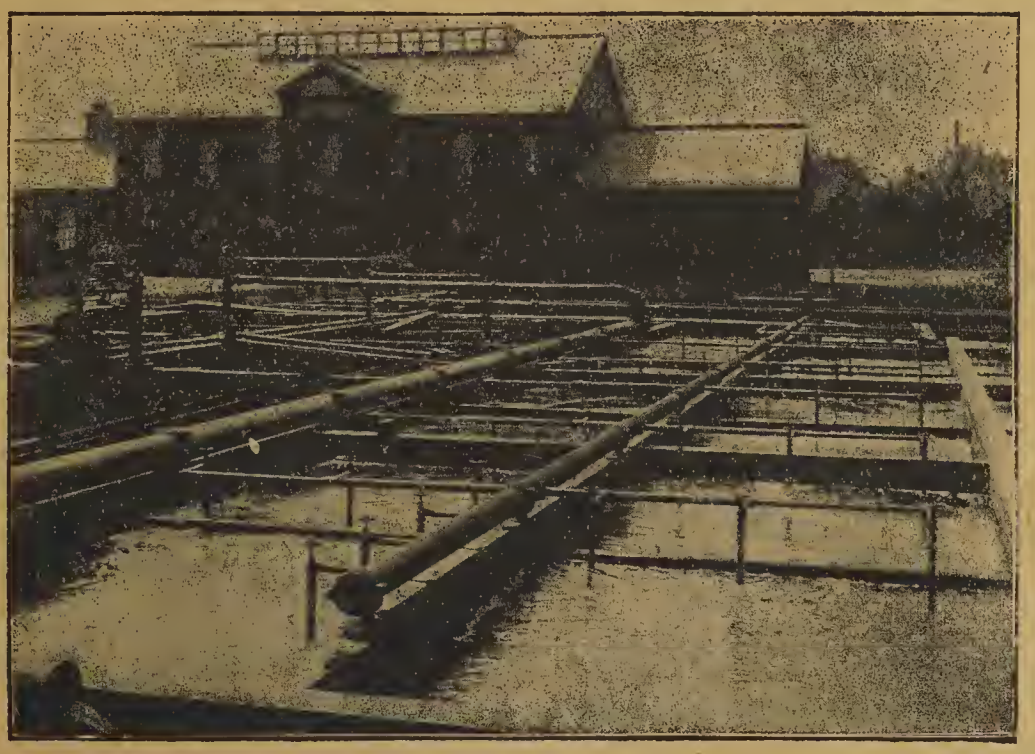

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"J and A" Sewage Ejectors, Air Lifts, &c., Booklet S 48.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

STOCKTON.—October 12th.—For alterations at the new maternity home.—The Borough Engineer, Victoria Buildings, Stockton.

DUNSTABLE.—October 15th.—For facing a portion of the filter walls at the sewage farm with Staffordshire bricks.—Mr. W. F. Wilkins, borough surveyor, Town Hall, Dunstable.

BEDFORD.—November 13th.—For the erection of buildings and reinforced concrete coal bunkers.—The Engineer, Electricity Works, Cauldwell-road, Bedford.

Engineering: Iron and Steel.

MANCHESTER.—October 11th.—For the supply and erection of a coal conveying plant.—Mr. F. E. Hughes, Town Hall, Manchester.

BATTLE.—October 19th.—For sinking a well.—Mr. F. C. Shepherd, clerk, Urban Council Offices, Battle, Sussex.

Roads.

WHITCHURCH.—October 14th.—For steam rolling the district roads.—Mr. H. Grinham, acting clerk, Rural District Council, Whitchurch, Hants.

SALFORD.—October 16th.—For carting and horse haulage.—The Superintendent, Sewage Works, Wilburn-street Depot, Salford.

Sanitary.

JOHANNESBURG.—January 8th.—For the supply of 5,000 sanitary pails with eyelet holes and lids for the same.—Department of Overseas Trade (Development and Intelligence), 75 Basinghall-street, E.C. 2.

Miscellaneous.

GELLYGAER.—October 14th.—For the supply of limestone, paving, kerb, and channel, drain pipes, cement and lime, cast-iron goods, smithwork, ironmongery, brushes, oils and paint and oilskin suits.—Mr. T. Rees Gabe, acting surveyor, Urban Council Offices, Hengoed, Glam.

PORTSMOUTH.—October 15th.—For the supply of ballast sand, grit, Portland cement, brooms, brushes, oils, timber, and castings and machine parts.—Mr. V. G. Lironi, engineer, Engineer's Office, Vivash-road, Fratton, Portsmouth.

HERTFORD.—October 19th.—For the supply of oil, waste, water fittings, brooms, shovels, manhole covers and gully grates.—The Borough Surveyor, The Castle, Hertford.

The Editor will be glad to receive copies of annual and other reports dealing with matters of interest to "Surveyor" readers.

APPOINTMENTS OPEN.

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BOROUGH OF LOUGHBOROUGH.

WATERWORKS DEPARTMENT.

APPOINTMENT OF TEMPORARY WATER INSPECTOR.

The Corporation require the services (temporarily) of an experienced Waterworks Inspector (ineligible for Military Service). Candidate must be a qualified Plumber, thoroughly practical, and accustomed to the use of waste water meters, and capable of executing small repairs to meters.

List of duties on application.

Wages, 38s. per week and uniform, with 7s. per week plus 10 per cent war bonus.

Applications in candidate's own handwriting, accompanied by copies of not more than three recent testimonials as to character and abilities, to be forwarded to me not later than noon on Tuesday, the 22nd October next.

ALBERT H. WALKER, ASSOC.M.INST.C.E.,
Borough Surveyor and
Waterworks Engineer.

Town Hall, Loughborough.
October 8, 1918. (3,887)

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The Surveyor

And Municipal and County Engineer.

Vol. LIV. OCTOBER 18, 1918. No. 1,396.

Minutes of Proceedings.

Water Supply and National Control.

At the annual meeting of the Municipal Waterworks Association recently an important memorandum on the National Control of Watersheds and other Sources of Water Supply—printed in our last issue—was submitted by Mr. Henzell, the waterworks engineer to the Leeds Corporation. In view of the vital importance to the health and trade of any community of a good water supply and also of the fact that there are to-day many authorities who have nearly come to the end of their present resources and are looking out for further gathering grounds, the question of national control is one of great urgency. Hitherto the situation has been virtually controlled by the larger and more wealthy undertakings, and the smaller authorities have often received but scanty consideration. Hence the necessity for the inauguration in the near future of some system of central control. The matter is by no means a simple one. For example, as Mr. Henzell pointed out, it is obvious that an authority that has an abundance of water, owing to its foresight in making adequate provision for future requirements, will not be anxious to throw its surplus into the common stock—at all events, not without full compensation, including a portion of its capital outlay. Then again, serious financial questions will arise from the fact that in the thickly-populated parts of the country nearly all the best and most accessible areas have already been acquired, and those that are left are either inferior, geologically or otherwise, or are so distant from the points of consumption that the cost involved would be almost prohibitive if it has to be borne entirely by the authorities seeking a supply. Mr. Henzell suggested the setting up of a committee by the Municipal Waterworks Association to hold a systematic inquiry into the present situation and to draw up a report on existing sources of supply, both allocated and unallocated, and their use for immediate needs and future requirements. This proposal has much to recommend it, and the only suggestion we have to make regarding it is that the association should consider the advisability of seeking the co-operation of the non-municipal undertakings in the work.

* * * *

Lowestoft Town Council and War-time Damage.

The question of general war damage, apart from special damage such as that sustained by sewer and water pipes through bombardment, has been taken up by the Lowestoft Town Council, and it is to be trusted that something will come of their action so as to place this matter upon a sounder footing than is the case at present. The resolution adopted by the town council refers to damage done to the actual property belonging to the town council by the military authorities through the war, and it is proposed that the town clerk, the borough accountant and the borough surveyor should act as a committee of investigation to ascertain the damage and the approximate cost of reinstatement so that upon the termination of hostilities no difficulties will arise as regards the facts at issue. The matter will, of course, be appreciably simplified if the War Office accept the invitation of the town council to appoint an overseer to confer with the municipal officials. It was stated that to repair the damage at Lowestoft would cost an enormous amount of money. It would appear from the statements made that some sort of compensation has already been paid or promised, but this is held to be almost ridiculously inadequate to meet the case. This is quite in accord with the universal practice of Government departments, whose performances invariably fail to correspond with the promises made on their behalf. Officials have their own particular view with respect to these matters, and it is the custom of a department to accept this view as the only means of settling disputable claims. There should, however, be no occasion for dispute when claims are assessed on behalf of a public authority by officials who are, if not independent, at least disinterested, and it would certainly be a gross injustice if ratepayers, many of them very poor in worldly circumstances, were called upon to make good a large proportion of the war damage which ought to be borne by the public exchequer.

* * * *

A Voice from France.

Indications are not wanting that the men—and particularly the young men—who are away on foreign service are taking a very keen interest in the "home front," especially in so far as conditions there affect their own future prospects. It must be remembered that the great majority of these men have voluntarily interrupted their civil career at the call of duty and have thus earned the right to be heard in any discussions upon home topics in which they have a direct concern. It was with peculiar pleasure, therefore, that we received last week from a young surveyor serving with one of the Sanitary Sections in France a letter upon the vexed question of salaries. We have never failed to draw public attention to cases of flagrant underpayment that have been brought to our notice from time to time; but our young correspondent goes further by suggesting for the consideration of local authorities some practical reasons to show that a policy of cheeseparing with regard to official salaries is not only not economical, but is positively bad business. In the first place he points out that when the salary of an official is carefully adjusted to represent the bare face value of the routine duties that he has to perform, he has no incentive for experiment or research with regard to possible improvements or economies in old methods. In other words, he will inevitably work in a groove and his council will fail to benefit by the general progress that must always be taking place in the municipal engineering world. Again, those authorities which offer the ridiculously low salaries to which we are compelled to call attention from time to time do not, we are glad to say, as a rule attract the services of a properly trained and qualified surveyor. The result is that as soon as there is any special piece of work to be carried out, they are at once obliged to retain and pay for the services of a consultant. These are both points which local authorities would do well to bear in mind when fixing salaries and they want to combine efficiency with real economy.

* * * *

Afforestation.

At the recent annual meeting of the Municipal Waterworks Association, Mr. J. Parry, M.INST.C.E., dealt with the problem of afforestation, which has assumed a new urgency owing to the depletion of our existing woodlands for purposes connected with the war. The subject is one which has received attention by the Government from time to time for some years past. As long ago as 1902 a Departmental Committee of the Board of Agriculture recommended that the attention of corporations and municipalities be drawn to the desirability of planting with trees the catchment areas of their water supply. Again, in 1908 the subject of afforestation was referred to the Royal Commission on Coast Erosion as part of an inquiry into unemployment. No substantial progress has been made, however, and it was not until the outbreak of war that the seriousness of the situation was realised. For many years Mr. Parry has advocated the adoption of large schemes of afforestation in this country, and the need is greater to-day than ever. State action on a liberal scale is undoubtedly necessary if real progress is to be made, but the co-operation of landowners and local authorities should be sought. The proposal that the State should take into direct employment the vast amount of labour required to afforest extensive new areas also requires the most careful consideration. For lands of the kind which usually constitute the upland gathering

grounds of waterworks there can be no doubt that properly managed tree planting will prove to be a profitable investment, apart altogether from its advantages in contributing to the purity of the water supply, while for private landowners the excellent prospects of a remunerative market in the future for home-grown timber should offer strong inducements to the investment of capital.

* * * *

The Joint Roads Committee. Considerable interest attaches to the announcement that has just been made of the appointment by the Army Council of a Joint Roads Committee. This committee will be charged not only with carrying into effect with regard to public roads the powers of control and maintenance vested in the Army Council under the Defence of the Realm Regulations, but also with performing certain duties in connection with the construction, improvement and maintenance of such roads for war purposes. We assume from the use of the word "joint" in the title of the committee that it comprises representatives of the Road Board as well as of the Army Council. A vast amount of excellent work has been accomplished during the past four years in the preservation of our roads from the ill effects of the strain to which they have been subjected by a vast amount of military traffic; and this work is apparently to be continued under the auspices of the new Joint Committee under the chairmanship of Brigadier-General Lord Montagu of Beaulieu. In the absence of further information as to the precise constitution and formation of the new committee, we are unable to say anything with regard to the policy which has brought it into being. We venture to hope, however, that its appointment is not intended as a step towards the military control of the roads after the war.

WATER SUPPLY IN ABERDEEN.

BENEFITS OF COVERED RESERVOIRS.

The water engineer of Aberdeen, Mr. Cecil H. Roberts, M.INST.C.E., in the course of his report for the year ending May 31st last, states that the benefit of covering the reservoirs and the effects of filtering continues to be noticed in the much greater cleanliness of the reservoirs and aqueduct, the number of cleanings necessary both of the reservoirs and of the aqueduct being less than half of what it was previously. The average rate of working of the filters during the year was 3½ million gallons per acre per day, the rate increasing to considerably beyond this during frost periods and whenever one of the filters was being cleaned. This rate was much higher than was desirable, and it was important that the necessity for constructing additional filters should be kept in view, and that extensions should be carried out at the earliest opportunity. The quality of the water leaving the filters, as indicated by the results of bacteriological examinations, had been uniformly good, the bacillus coli communis having been absent in 100 cubic centimeters of water in 89 per cent of the samples examined.

The tap water in Aberdeen, as well as the water entering Mannofield reservoirs, had been less satisfactory than the water leaving the filters, as it was also in the previous year. The deterioration was no doubt attributable to leakages of foreign water into the aqueduct, as pointed out in previous reports. The tap water, however, showed a distinct improvement in the quality as compared with that in the previous year, although it was still very definitely inferior to the water leaving Invercannie.

Since 1913-14, when the liming and filtration commenced, the typhoid fever rates had been lower than ever before since notification began. It was also believed that the single notification in 1917 constituted a record for any town of the same size in the United Kingdom.

The domestic water rate in the city is 2d., and the public water rate ¾d. in the £. The charge for water supplied by meter in the city is 5d. per 1,000 gallons for the first 5,000,000 gallons, decreasing on a sliding scale, to a rate of 2d. per 1,000 gallons for all quantities in excess of 20,000,000 gallons during the year.

The Development of Inland Waterways.—The City of London Corporation recently adopted a report by its County Purposes Committee in reference to the inland waterways of the country. The committee stated that the principles for improvement laid down by them in their original report had received the cordial support of upwards of 250 public bodies. The attention of the Government had also been attracted to the subject, and it appeared that real consideration would shortly be given to what was undoubtedly a burning question of the immediate future. The full development of the waterways would, in the committee's opinion, be of incalculable assistance to the traders and workers of the kingdom in the strenuous times ahead.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

THE HOUSING PROBLEM: CONDENSATION ON CONCRETE.

To the Editor of The Surveyor.

Sir,—The American Concrete Institute is doing good in publishing a warning on condensation, for it is not well known that concrete is subject to condensation when the air is wet or humid and that a non-porous concrete is subject to more condensation than a porous concrete. For instance, a weak concrete of broken brick aggregate will have proportionately the same porosity as the porous brick itself. We all know that brick walls when plastered with lime mortar are seldom subject to condensation.

Interior plastering will, however, prevent condensation on any sort of concrete. I have spent many pounds and much time in experimenting with various plaster mixtures, to find the most absorptive plastering material. I found that a good method is to float on the interior of the concrete walls with ordinary plasterer's lime and sand mortar (about 3 of sand to 1 of lime), lightly keyed in the usual manner to receive the final setting coat. This 3 and 1 coat must be left until strong pressure from the thumb makes no impression. It may be necessary to leave it for several days, according to the weather. The finishing coat of lime putty, sand and plaster of Paris may then be applied with safety. Immediately before the latter coat sets, it should be finished with a soft hair brush which produces a granular surface—a further method of absorbing moisture.

The finishing coat is known in some districts as "plasterer's skimming." It is also known as "limed plaster." The proportions depend on the quality of the lime, which varies in different districts. I discovered the best, easily obtainable skimming for absorption was the following. It gives a good finish, sets well, and works quickly: 3 parts of lime putty or chalk lime, 6 parts of washed sand, 1 part of plaster of Paris.

Instead of making dense concrete for walls, it is much cheaper and more hygienic to use a very porous concrete, and to render it with a cement waterproofed exterior coating, for the fiercest driving rain cannot penetrate a ¾-in. Pudloed cement rendering. Porous concrete, like all porous materials, has also the quality of retaining the heat engendered in the room, thus giving a warmer dwelling. Therefore porous concrete has the dual advantage of assisting the absorption of condensation and of conserving heat.

I shall be pleased to hear from any person who is interested in my investigation into the effect of the absorption of various plastering materials.—Yours, &c.,

J. H. Kerner-Greenwood.

King's Lynn.
October 9, 1918.

COB BUILDING.

To the Editor of The Surveyor.

Sir,—I am glad that the above was mentioned in last week's issue. While surveyor and sanitary inspector of a large rural district in Devon, I had considerable experience in cob cottages, and from experience in the inspection of a considerable number of houses under the Housing and Town-planning Act, I found them to be considerably drier than brick or stone walls in the damp West country climate. I have seen pulled down several old cob cottages, probably one or two hundred years old, and was surprised to find that they had slate dampcourses of the local slate stone about 1 in. thick. The important point with cob is to have wide, projecting eaves, as the slightest wet soaking in at the top causes them to perish. I have recently been staying at a friend's house in Wiltshire built of cob, and though an old house, I was struck with its warmth and comfort. The material is cheap, as it is easily obtained in most clayey soils and often close at hand, thereby effecting a saving in haulage.

I am confident that local authorities should encourage as far as possible reviving this ancient art, especially in rural or small urban districts. I can see in it nothing contrary to the Model By-laws, nor, if properly constructed of clean earth, nothing objectionable from a sanitary point of view. The work is carried out with boarding and strutting, similar to concrete walling, and the clay or earth is pugged and mixed with straw for binding, and then rammed between the boards. The walls are brought up evenly, and before the lintels to openings are fixed, or the floor joists and templates are laid they are allowed time to settle.—Yours, &c.,

Walter H. Whitaker.

Public Offices,
Cheriton, Kent.

A Change of Title.—At the recent annual meeting of the Municipal Waterworks Association, a change of title to the British Waterworks Association was agreed upon.

The Control of Small Sewage Disposal Works.

By JAMES H. EDMONDSON, F.C.S., Chemist and Manager of the Southall-Norwood Sewage Disposal Works.*

In the control of small works, as in large ones, efficiency in combination with economy is the goal to be aimed for. The author has frequently seen when visiting various sewage works that the effluents leaving small works are infinitely better than those leaving larger ones—in fact, in the author's opinion, many of the effluents are too good, if such can be the case, and consequently economy must have suffered to attain this high degree of purity. This probably arises through insufficient knowledge of the sewage treated and effluent obtained, and consequently the sewage has been put through more processes or treated on a larger area than is really necessary to produce a satisfactory and stable effluent. If, however, systematic records, not necessarily of a highly technical character, were kept, they would be of great assistance in determining any further treatment, and also satisfy those responsible of the results obtained day by day.

RECORDS.

The quantity of sewage delivered at the disposal works is of the first importance. This is fairly simple to determine on a small works without going to the expense of fixing a recorder. Good approximate results can be obtained by the use of a rectangular weir or V-notch, and recording the depth flowing over same every hour or half-hour. The effluent can also be recorded by fixing a rectangular weir at the outfall from each channel or main channel from the filters, as at the Southall works.

The quantity of tank effluent each bed, filter or plot of land treats can often be approximately estimated by recording the number of hours each unit works per day, providing a practical test has been previously carried out of the quantity each unit treats per hour. In cases where pumping is necessary, the time the pumps are at work usually gives a true record of the flow, any appreciable increase being due either to loss of efficiency of the pumps or increase in flow.

The measurement of the sludge at the time of cleaning the tanks—which is easily accomplished—along with the number of days such tank has been at work, is of considerable value. Any appreciable increase may be due to increase of flow, which should be accounted for above or increased strength of sewage. On the other hand, should there be an increased flow of sewage delivered at the works whilst the production of sludge is normal, of course eliminating storm water, it will probably be found to be due to subsoil water leaking into the sewers or some other sudden discharge into the sewers.

These, with many others, which are particularly adapted to individual works, are common-sense records, and are no doubt kept by many of the members of this institution. There are in addition, however, a few chemical and physical tests which can easily be applied, and in conjunction with the above records will enable one to have a small works under thorough control.

ANALYSES.

You will no doubt be familiar with the items of analyses the analyst presents when reporting on the examination of a sample of sewage. The results given are usually expressed in parts per 100,000, and even then some of the figures are small decimals, which can hardly be arrived at by simple or rough-and-ready methods. There are methods, however, which approximate to one or two of the tests if not the figures. One of the principal tests which can be so approximated is the 4-hours' oxygen absorption test. This is carried out by placing a known quantity of the sample under examination in a standard solution of acidified potassium permanganate (containing available oxygen) which will oxidise any organic matter present. As is well known, potassium permanganate solution has a brilliant purple colour, which gradually disappears with the loss of its available oxygen, being colourless when all the oxygen has been absorbed. Upon this characteristic a simple test has been devised. Other tests are presence of nitrates, turbidity, odour and stability, which will be briefly described along with the necessary chemicals and apparatus, which can be obtained at a very nominal cost.

Oxygen Absorbed.—Apparatus and chemicals required: One pair of apothecary's scales, one or two weights totalling 0·4 gramme, one litre graduated flask, 10 cc., 25 cc. and 100 cc. graduated cylinders, pure sulphuric acid, potassium permanganate, and a stock (6-8 oz.) of stoppered bottles.

Solution.—Weigh out on the scales 0·4 gramme of potassium permanganate, and place in litre graduated flask, and dissolve in a little good tap water; add 100 cc. of sulphuric acid and allow to cool. When cool, make up to the litre mark with water.

Method.—Place in a stoppered bottle 100 cc. of sample to be examined and add 10 cc. of the acidified solution of potassium permanganate. Note how long it takes for the colour to entirely disappear. With crude sewage this may occur in a few minutes; with a good effluent it may take some hours.

Presence of Nitrates in the Effluent.—Apparatus and chemicals required: One Nessler tube, a solution of 1 per cent brucine sulphate and sulphuric acid. Place 5 cc. of effluent in the Nessler tube and add 2½ cc. of brucine solution, thoroughly mix and add 2½ cc. of strong sulphuric acid down the side of the tube, which will settle at the bottom. If a pink zone forms, gradually changing to amber, nitrates are present—the more marked the reaction the more nitrate present.

Turbidity.—Apparatus required: Piece of white cardboard with black lines ruled across, a ground bottom Nessler tube at least 6 in. in height and 1 in. in diameter, graduated up the side. Shake the sample thoroughly and slowly pour into the Nessler tube, which is placed on the paper, until the black lines are obscured. A satisfactory effluent should show a depth of 4 or more inches.

Odour and Stability.—Apparatus and chemical required: Stoppered bottles and a solution of methylene blue. A good effluent should have no offensive odour at the time of sampling or even after being kept in a stoppered bottle in absence of air for four to six days at a temperature of 80 deg. F. The stability can be estimated by tinting the sample in the bottle with about six drops of methylene blue solution before placing on one side or in an incubator. Examine the sample daily, and should the colour persist until the fourth day one can be satisfied of the stability of the sample. If an effluent has a deficiency of dissolved oxygen and nitrates it is invariably found that it is charged with an excess of organic matter, and consequently will be found to be unstable, emitting a disagreeable odour, and discolouring methylene blue upon incubation. If the colour persists for four days it is usual to record it on the record sheet with a + sign; if it disappears within four days, with a − sign.

The following is a typical method of recording the results:—

FINAL EFFLUENT.

Date.	Oxygen absorbed.	Nitrates.	Turbidity.	Odour.	Stability.	Approx. quantity treated.	Rainfall.	Temperature	
								Max.	Min.
Sept. 2	6 hrs.	Strong	4½″	Earthy	+	—	Nil	90	58
Sept. 3	3 hrs.	Slight	3″	Stagnant	−	—	Nil	98	60

Whilst advising that such records and elementary tests would prove of great assistance in the control of small works, and which can easily be carried out by any intelligent workman, the author would certainly recommend that periodical samples be submitted to an analyst and his report compared with the results obtained on the works. By such means the manipulator could fix his own limitations to the elementary tests just described.

In conclusion it may be mentioned that in considering an analyst's report the following four tests are usually taken as standards:—

1. The 4-Hours' Oxygen Absorption Test.—A permissible effluent should absorb less than 1·40 parts per 100,000; a good effluent under 1·0 part.

2. The Albuminoid Ammonia Test.—A permissible effluent should contain less than 0·15 part per 100,000; a good effluent less than 0·10 part.

3. Suspended Solids.—The Royal Commission recommends that a final effluent should contain less than 3·0 parts per 100,000.

4. Dissolved Oxygen Test (oxygen absorbed from tap water in five days at 65 deg. F.).—The Royal Commission recommends that a final effluent should not absorb more than 2·0 parts of oxygen per 100,000.

Pig-keeping at Lewisham.—A report of the Lewisham Works Highways Committee stated that six pigsties and a shed for boiling and storing food had been built at the Woodstock-road depot, Lee. After utilising old material the total cost was about £112, including the inclosure of a piece of ground to form a run. The mayor, the chairman (Alderman R. Jackson, and the borough surveyor (Mr. E. van Putten) had purchased twenty nine-weeks-old pigs at 32s. 6d. each and seven (fourteen weeks old) at 50s. each. A 40-gallon copper was to be purchased, at £10 10s., for use in the preparation of the food; eighteen small dustbins, at £12 18s., for collecting food from institutions in the borough, and a ton of meal at £38. One of the council's carmen had been appointed pig-keeper (part time) at 55s. per week.

* Paper presented at the annual meeting of the Institution of Municipal Engineers.

ASPHALT CONSTRUCTION IN RAINY WEATHER.

By T. G. Marriott,

Engineer, the Limmer and Trinidad Lake Asphalt Company, Limited.

A reference in a recent issue of the *Engineer* to the subject of laying asphalt during rainy weather has prompted the writer to set out some statistics of weather collected during the carrying out of a sheet asphalt paving contract for the corporation of Oxford in 1915-16.

The work in question comprised the laying of about 5 miles of 4½-in. Trinidad asphalt macadam on the principal motor omnibus routes of the city—viz., Park End-street, New-road, Cowley-road, The Plain, Magdalen-bridge, Banbury-road, Abingdon-road, Folly-bridge, and St. Aldate's. The asphalt was laid in two coats direct upon the existing roadbeds after the usual scarifying and rolling to required levels. No Portland cement concrete was used throughout the contract, the conditions of which provided for the continuous prosecution of the work during the winter months, subject to the discretion of the City Engineer.

It was in this connection that the contractors arranged with the principal of the Radcliffe Observatory, Oxford, for the monthly record of weather statistics, and of these the number of rain days and total rainfall are now presented in chart form, together with the corresponding monthly output in tons of asphalt mixture from the paving plant. The latter was of the company's small, semi-portable type, consisting of twin "Rotosec" dryers, 10 ft. by 10 ft. mixing tower and three portable bitumen tanks. The plant was driven by a 15-h.p. steam engine, and was situated in the goods sidings of the London and North-Western Railway Company's station at Oxford, an average distance of 1½ miles from the site of the work.

A reference to the chart will show that the contract was spread over eleven months, and thus embraced a cycle of the seasons. Allowing for the reduced hours of daylight in the winter months it will be seen that a fair output was maintained from the plant, the abnormal March (the wettest with one exception in 100 years according to the observatory records) being the sole period during which the weather prevented the manufacture and laying of the asphalt.

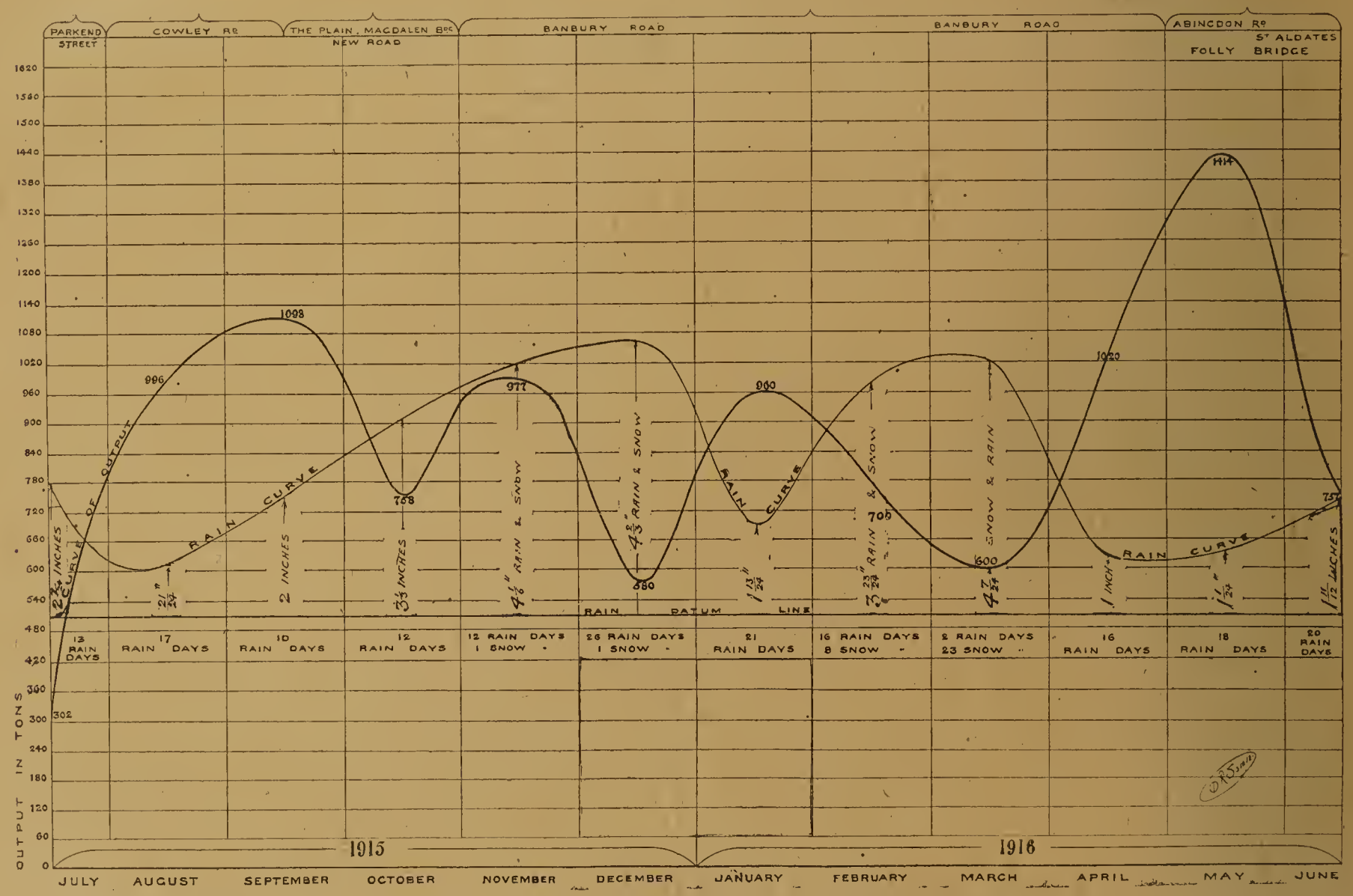
While in the total the mean rainfall of Oxford is not greatly in excess of that of London, the winter climate of the city is by no means a favourable one for the laying of asphalt, being for the most part damp and raw, with occasionally extremely low temperatures. The subsoil of the roads was found to consist largely of valley gravel, and was thus of good quality for the work; but at the time of the stoppage on the Banbury-road, already referred to, considerable amounts of clay were met with in the foundations. On the whole, however, the asphalt laid in the winter months at Oxford bears favourable comparison with that laid in the summer, and the writer sees no reason to doubt the efficacy of modern two-coat asphalt constructed during moderately rainy weather.

Given the essentials of a suitable sub-foundation, and particularly a well-designed asphaltic concrete base, it would seem that the wearing surface or "topping" may be put down in any conditions of weather that the workmen engaged in laying it can tolerate. On the other hand, the prejudice of engineers against the laying of compressed rock asphalt in any but the most favourable weather conditions is probably justified by the fact that this type of asphalt is always put down in a single layer upon a Portland cement concrete foundation, and is somewhat absorbent of moisture until full compression under traffic is obtained.

ASPHALT AND WATER ABSORPTION.

The difference between rock asphalt and mechanically-mixed asphalt in regard to water-repellency at the time of laying is sharply brought out by a laboratory experiment the writer recently carried out. A small amount of each kind of asphalt was taken in a loose condition and agitated in an equal quantity of water for 30 sec. in a test tube. The rock asphalt (Sicilian) contained 10·5 per cent of soluble bitumen. The mechanically-mixed asphalt contained 11·7 per cent soluble bitumen (Trinidad). After agitation, both samples were allowed to filter for 1¼ hours. At this point the rock asphalt showed 67 per cent of moisture and the mechanically-mixed asphalt 29·9 per cent. The samples were then placed in an air bath at 220 deg. Fahr. for half an hour. It was then found that the mechanically-mixed asphalt had thrown off all its moisture with the exception of 2·5 per cent, while the rock asphalt powder still held 29·8 per cent. Thus it will be seen that not only was the rock asphalt in this condition far more absorbent of water, but that it gives off its moisture more slowly than the mechanically-mixed asphalt.

These conclusions are in no way intended to impugn the quality of compressed rock asphalt. On the contrary, the writer believes this type of construction to represent the highest standard of asphalt paving for heavy traffic. It is merely intended to put forward reasons why the prejudice of engineers against the laying of rock asphalt in rainy weather need not necessarily be extended to the modern two-coat mechanically-mixed asphalt. This latter form of asphalt, consisting as it does of fine particles coated with an adhesive film of bitumen, is obviously more water-repellent at the time



Asphalt Paving Contract, Oxford, 1915-16: Chart showing Comparative Meteorological Data and Tonnage Output.

of laying than rock asphalt powder with its light impregnation of bitumen, and thus lends itself more readily to successful application during rainy weather. Moreover, in the two-coat work the bottom layer of asphaltic concrete or "binder" acts as a key for the wearing surface or "topping," even when rain is falling, and also serves to a large extent to drain away any surface water.

It would seem, therefore, that modern mechanically-mixed asphalt is in a fair way to adapt itself to all-the-year-round work, and in view of the large areas of road reconstruction to be faced in the immediate future in the renewal and repair of wood paving and the extensive schemes which are foreshadowed after the war both in this country and the Continent, this is perhaps a feature from which engineers, contractors and the public alike may derive some satisfaction. In any case it is hoped that the inferences drawn from the accompanying authenticated data may afford some interest upon the subject of laying asphalt during rainy weather—a matter which the writer believes will force itself upon the authorities at no distant date.

The writer is indebted to Mr. Ramsay Smith, the company's mechanical engineer, for the preparation of the accompanying chart.

HOUSING NOW AND AFTER THE WAR.

LOCAL AUTHORITIES AND THE SUPPLY OF MATERIALS.

In reply to a letter from the Association of Municipal Corporations suggesting that the Government should accumulate stores of raw materials required in connection with housing schemes, and to sell to local authorities at cost price, the Ministry of Reconstruction state that their Building Materials Supply Committee do not feel able, under present conditions, to recommend the course proposed. The committee are of opinion that it would be desirable that local authorities should forthwith enter into contracts with manufacturers of bricks, &c., for supplies for post-war delivery at an agreed price to represent cost of production and a reasonable profit. This would, in the opinion of the committee, have the effect not only of placing local authorities in a position to build at as early a date as possible, but also of stimulating production, since manufacturers are, in the absence of a market, not anxious to accumulate stocks.

DATA FOR COTTAGE BUILDING.

Some time ago, at the request of the Committee of the Privy Council on Scientific and Industrial Research, the council of the Society of Architects submitted to that body a programme of its proposals for research into the question of the greater utilisation of local materials in building construction. While this programme was under consideration by the committee, the housing question became more acute, particularly in regard to the supply of cottages, and the society was asked for the time being to concentrate its efforts on obtaining certain data from its members instead of proceeding with the more elaborate scheme referred to. The co-operation of the members of the society is therefore being invited in supplying data relating to local methods and building materials adopted and used in various parts of the country in connection with the erection and design of cottages, together with information as to the possibility of combining standardised structural units with local materials, and finding suitable artificial substitutes for such building materials as it is difficult or impossible to obtain at the present time, and which are likely to be scarce for some time after the end of the war. The object in view is the effecting of economy in the construction and erection of dwellings and the eliminating so far as possible of transport and other difficulties which might hinder production.

WOMEN'S COMMITTEE'S INTERIM REPORT.

Improved methods of heating, better hot-water systems and labour saving arrangements in houses to be erected in the future are favoured in the interim report of the Women's Housing Committee of the Ministry of Reconstruction. It is regarded as essential that each house should have as a minimum three rooms on the ground floor (living room, parlour, and scullery) and three bedrooms above, two of them being capable of containing two beds. Angle-placed skirtings for bedrooms, of concrete rather than wood, are recommended to reduce dust. Other points about the ideal home:—No winding stairs; more shelves and cupboards, living room to be as large as possible, at cost of the parlour if need be; a garden attached to each house; only twelve houses to the acre; a common playground for each considerable group of houses, with covered shelters.

Hailsham Rural District Council report that 173 houses will be required after the war.

Hull City Council have confirmed the purchase of 75 acres of land on the Hessle road at £453 15s. per acre for the purpose of a housing scheme.

Taunton Town Council have decided that 300 dwellings will be required, and land has been purchased on which to erect 150.

Evesham Rural District Council have decided to apply to the Local Government Board for sanction to loans amounting to £9,800 for the erection of twenty-four cottages at Badsey, and £5,750 for the erection of sixteen cottages at South Littleton.

The Government having urged upon the Burton-upon-Trent Council the necessity of providing additional housing accommodation owing to the increasing population, the committee charged with the scheme have selected a site on the Branstone road, on which, should the recommendations be agreed to, a large number of houses will be erected. It is understood that the Government department concerned intend to provide a recreation ground.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is it not interesting to find, from a recently issued financial report, that the International Association of Road Congresses, which has its headquarters in Paris, is still alive, and that for the year 1917 about £1,320 was subscribed by various countries for its maintenance ?

* * * *

What is the real law with regard to the clipping and trimming of hedges adjoining public roads ? Why is it that some road authorities instruct their surveyors to do this work with their own employees, whilst others say it is the duty of the occupier or owner of the adjacent lands ? Would not uniformity of action in this respect be a great boon, as not only are unclipped hedges often very damaging to the surface of a road, but also very dangerous in narrow roads or at awkward corners ?

* * * *

Is there not rather a bad lookout for tramways just now when it is almost impossible to obtain rails and other materials for the proper upkeep of the permanent way ? Is it not common knowledge that many miles of tramway lines are in need of urgent repairs ? Even after the war, as the *Commercial Motor* recently pointed out, there will be a world demand for steel rails, and as the railways will have the first call, may it not be assumed that the public will have to turn to the motor 'bus for relief ?

* * * *

Is there not a good opportunity now presenting itself to the various engineering societies in London to offer assistance and to extend a welcome to the numerous professional Americans and Colonials who are now in this country as officers or privates ? Would not many of these men be glad to avail themselves of the opportunity to inspect some of our engineering centres, and to learn something of our latest developments in sanitation, road making, and other branches of engineering ?

* * * *

When demobilisation of our troops takes place, is it not to be hoped that all municipal authorities will do their best to re-engage all the officials and workmen who have temporarily left their services to take part in the defence of their country ? Should not preference be shown to these men, and would it not be a better policy than engaging the services of men who had never received any training in municipal work and procedure ?

* * * *

If concrete dwelling houses can be erected in many localities at much less cost than houses of brick or stone or other materials, what are the main objections to this class of house ? Are they not chiefly monotony in appearance, and rather crude design, fear of their becoming damp, time required for drying before occupation can take place, difficulty of driving nails into concrete, and the possibility of ugly stains in the exterior surface after rain ? If these are the only objections, could they not be entirely overcome by a little skill in design ?

* * * *

Was not an article on "Problems of Housing" in the *Times* of October 9th very opportune, and did it not strike a note of warning that the orgy of house building for the working classes which will probably follow the declaration of peace must be carefully watched, "or houses will be built where they are not wanted, and the movement may tend towards a rivalry between local authorities as to which of them can erect more houses than the others and a general scramble may be the result" ? Have we not fortunately, however, a safety valve in the Local Government Board, who will doubtless see that there is a genuine demand for certain classes of houses in certain districts before any scheme can be entertained, and is there any likelihood that the board will be actuated by any fear or favour in giving their decisions ?

Institution of Municipal and County Engineers.

MEETING AT BARRY AND PENARTH.

A meeting of the Institution of Municipal and County Engineers was held at Barry and Penarth on Friday and Saturday, the 27th and 28th ult., under the chairmanship of the president, Mr. T. W. A. Hayward, M.INST.C.E., F.S.I., Battersea. Other members present were Messrs. D. M. Jenkins, chairman of the South Wales district (Neath), C. H. Priestley (Cardiff), D. H. Price (Bedwellty), Geo. H. Phillips (Cardiff), Harold Collins (Colchester), E. Watkin Edwards (Pontllanfraith), E. J. Elford (Cardiff), A. J. Marshall (Merthyr), John Morgan (Blaenavon), Thos. F. Harvey (Merthyr Tydfil), F. Mansfield (Abergavenny), A. J. Wilcox (Abergavenny), W. Lowe (Pontypridd), Gomer Morgan (Pontypridd), T. H. Richards (Caerphilly), J. C. Pardoe (Barry), E. I. Evans (Penarth), and H. Alex. Clarke, district secretary (Briton Ferry).

A business meeting was held at the Barry Council Offices, where the members were welcomed by Mr. George Wareham, on behalf of the council. Mr. WAREHAM said he recognised the importance of the institution, and the benefit the community received wherever experts met to exchange views. He hoped they would spend a pleasant and profitable time at bright, breezy, bracing Barry, adding that, although it was accused of being a "mushroom" town as far as growth was concerned, Mr. Pardoe and his council saw that modernity played a conspicuous part in its development.

Replying to the welcome, the PRESIDENT apologised for appearing before them in the garb of a country farmer, and explained that it was due to the difficulties in railway travelling and the loss of his luggage. (Laughter.) He liked the chairman's description of his town—bright, breezy, and bracing—because they were three essential qualifications for engineers. This was the first time he had visited Barry, but he had heard of its wonderful development, and always had a desire to visit it. He had read through the excellent paper which Mr. Pardoe, the council's engineer, had prepared, and he was quite certain that if Barry was of "mushroom" growth, it was a model town and pleasant to dwell in. Mr. Pardoe's ability was reflected in his work, and the urban district council of Barry were to be congratulated upon having such a first-class engineer. After spending two days in their bright, breezy, and bracing town he would go back to smoky London with renewed vigour, and it would repay Battersea to lose his services for the time. As municipal engineers they looked upon these visits as one of the best means of education; they compared notes and criticised, and their respective councils shared the benefit. Therefore he hoped that local authorities would recognise that fact, and encourage the work of research as much as possible.

Mr. Pardoe then introduced his paper upon

THE PUBLIC WORKS OF BARRY.

The urban sanitary authority of Barry (Mr. Pardoe stated) comprises an area of 4,104 acres, of which about one-third is built upon. The site upon which the town is built rises gradually from sea level to an elevation of about 300 ft. The general contour of the district is of a hilly nature. The nature of the soil, except in the eastern portion of the district and Barry Island, where marl and mountain limestone are found, consists entirely of lias limestone, covered with a thin layer of clay.

The importance of the town of Barry is due to the docks. The total area of the wet docks is 114 acres. The docks are noted for their extraordinary shipment of coal, which amounts now annually to more than eleven million of tons, making it the premier port for shipment of coal in the Kingdom. Barry has also grown into a favourite seaside resort, and as many as 50,000 persons have visited the town in one day.

The present rateable value is £196,065, and the estimated population, 36,157.

DRAINAGE SCHEME.

The district is divided naturally into two areas. In the first or Cadoxton district, the level of the ground at Weston Bridge and that of a portion of a new road is below mean high water. The sewers in these roads are some 6 ft. lower still, and only at one point does the invert of the sewer approach the level of high water. The other or Barry portion of the district stands high, and all the sewers are placed above high water.

The scheme was designed for a population of 30,000, and of these 10,000 were allocated to the area round the Old Village, 12,500 to the area above Weston Bridge, and 7,500 to the area adjoining the new road, which area, being near the docks, might be thickly populated. The sewers are designed in this proportion.

GAS AND WATER UNDERTAKINGS.

The Barry gas and water undertakings were acquired in 1893, the purchase price being £200,000. The gas produced the first year was 20,000,000 cub. ft., and this year 220,000,000. The water pumped the first year was 100,000,000 gallons, and this year, 350,000,000 gallons. The total amount of money borrowed for purchase and extensions up to date is £335,000, and the amount outstanding at the present time, after allowing for money in sinking fund is £150,000.

PUBLIC ROADS.

The length of made roads and streets in the district is about 42 miles and 12 miles of back lanes, or a total of 54 miles.

A considerable portion of these roads have been tar sprayed.

The width of lanes vary from 8 ft. to 12 ft., and the width of roads and streets, including footpaths, from 36 ft. to 80 ft.

The council own and work a limestone quarry at Cadoxton, where there is a Marshall's portable engine driving a Baxter Knapping Motion Stone Crusher. Drills for boring are worked by compressed air. All the macadam for the side streets is obtained from this quarry.

PUBLIC ABATTOIR.

The public abattoir opened in 1897, and was erected at a cost of £6,500, from plans and under the supervision of the author. A loan of £6,500 at 3 per cent was obtained, repayable in twenty-eight years.

REFUSE DESTRUCTOR.

The refuse destructor, opened in 1891, was the first installation of this kind in the Principality.

An hydraulic press has recently been provided and fixed at a cost of £200 for the purpose of baling up old tins, of which 60 tons have been disposed of. A waste-paper press has also been purchased, and 7 tons of waste paper has been disposed of.

FIRE STATION.

This building is three storeys in height, and, in addition to the engine room, contains superintendents' and firemen's apartments, watch room, stables and hose drying tower.

The building has accommodation for one family and about a dozen firemen.

A mortuary has been built in the yard at the rear of the station.

HOSPITALS.

The infectious diseases hospital is situated at Colcott. The cost of the building was £6,146.

Plans have been prepared and application made for permission to erect additional wards and extra accommodation, but the Local Government Board have suggested that any future extension be carried out on the cruciform plan as at Keighley. This matter remains in abeyance until after the war.

The small-pox hospital is 2½ miles from the centre of the town, and a quarter of a mile from the nearest inhabited house. The site—2½ acres in extent—is enclosed with a stone boundary wall 6 ft. in height, and is approached from the road by a carriage drive about 200 yds. in length.

The cost of the building was £3,792 exclusive of site.

An accident and surgical hospital has been built on land adjoining Wyndham-street and the Central Park, and a cholera hospital and crematorium have been provided on Flat Holm Island.

PUBLIC BUILDINGS AND PARKS.

The new block of offices form part of a scheme which was accepted in competition in the early part of 1903.

The block of buildings includes accommodation for the medical officer, sanitary inspector, school-attendance officer, strong rooms, stores, &c., in basement, rates, overseer's and surveyor's department on ground floor, and clerks' and accountants' and large committee room on first floor. All the offices, &c., are approached from spacious halls on each floor, with the main entrance and vestibule at ground-floor level in a central position.

The public library and reading room was erected at a cost of £8,000, and consists of general reading room, lending library, ladies' reading room, museum and caretakers' quarters. There are also three branch reading rooms.

There are five public parks.

To equip a town of the size in a comparatively short time with all the various buildings which are found only in large towns, has meant a great amount of work, and such could not have been carried out without a far-seeing and go-ahead council such as the members of the Barry Urban District Council have proved themselves to be.

A number of maps, including one that he had prepared himself many years ago, before the Ordnance sheets came out, were hung in the council chamber, and explained by Mr. Pardoe. Mr. Pardoe welcomed the institution to Barry, and hoped the members and visitors would spend a pleasant time.

In proposing a vote of thanks to Mr. Pardoe for his excellent paper, Mr. H. ALEX. CLARKE (Briton Ferry) said he was

sorry the railway strike, now happily settled, had interfered with the attendance. He knew that Mr. Pardoe would give them some food for thought, and he had done it. The remarkable development of Barry had kept their colleague exceedingly busy, and the public works and planning generally would remain a monument to his ability and zealous labours.

Mr. D. M. Jenkins (Neath) seconded the resolution, remarking that as district chairman he felt greatly indebted to Mr. Pardoe, because he knew that under present conditions it must have been difficult for him to find time to prepare so complete a paper—a paper that would be a valuable record of public work. To equip a town of the size in a comparatively short time with all the various buildings which were found only in large towns meant, as the author has said, a great amount of work, and could not have been carried out without a far-seeing and go-ahead council such as the members of the Barry Urban District Council had proved themselves to be, but he (Mr. Jenkins) ventured to say that it could not have been done without the services of a man and engineer like Mr. Pardoe, to whom it had been a life-work. Those who had been more closely associated with Mr. Pardoe had always appreciated his worth as an engineer, and they rejoiced with him to look upon the many public works at Barry—lasting monuments of his work. It was a paper which did not lend itself to criticism until after they had seen the various works, but there were one or two points he should like to mention. For instance, the drainage scheme seemed to be worked out carefully, and with a close regard to the condition of storm water, but it would be interesting to know what proportion of the rainfall had been calculated in dealing with the capacity of the sewers? He took it that they were self-cleansing velocities. The rainfall statistics were interesting and noticeable by the fact that the monthly rainfall varied so little—a general characteristic of seaside rainfalls, perhaps. Barry was very fortunate in having a rainfall of 7·42 in. as the highest monthly rainfall during the last ten years, and a comparison with his own town at Neath might be interesting. There they had already had 12½ in. of rainfall for September. The highest rainfall they had ever had was 14 in., and that was in the month of December. The rainfall for September in previous years had never been more than 6 in. What the extenuating circumstances were he could not say, but they had to put up with it. (Laughter.) He was particularly struck with the system of hospitals carried out at Barry, and the number of public parks and pleasure grounds. The allotment scheme had also been thoroughly taken up, and the figures showed that about 30 per cent of the householders had each an allotment, which was he believed the highest proportion in Wales.

Mr. E. J. Elford (Cardiff), supporting the resolution, said the records and statistics contained in the paper would form an excellent book of reference. Mr. Pardoe had evidently had the help, confidence and sympathy of his council, with the result that it had been more to the advantage of Barry than Mr. Pardoe, because an official could only do his best for the town if he had sympathy and help from those whom he served under.

The paper was eulogised by all the members present, and the vote of thanks was carried with acclamation.

The members were subsequently entertained to lunch by the chairman of the Barry Urban District Council, and were afterwards shown over the docks by Mr. W. W. Waddell, engineer to the Barry Docks Railway Company, the management kindly placing a saloon carriage at the disposal of the members for the purpose. The day's programme concluded with an inspection of Barry Island, and tea provided by Mrs. Pardoe. Here the president expressed the thanks of the institution to all who had contributed to the enjoyment of the visit.

VISITS.

On the Saturday the members inspected the various public works mentioned in Mr. Pardoe's paper. In the afternoon the members were the guests of Mr. E. T. Evans and his council at Penarth. A drive through the pretty residential town afforded the members an opportunity of observing the magnificent lay-out for which Penarth is noted. The visitors inspected the swimming baths, and walked through the beautifully-kept park and gardens. At the invitation of the management, the members visited the South Wales Portland Cement Works, and the various processes were explained by the manager, Mr. W. J. Cooper, who at the close entertained the members to tea.

Town-planning Scheme for Durham.—The borough surveyor of Durham, Mr. J. T. Pegge, has prepared a town-planning scheme, and the town council have decided that the whole area of the town should be dealt with, a sub-committee being appointed to carry this out and make a report.

Saltash Town Planning.—The Saltash Town Council have been urged by a Local Government Board inspector to at once submit a town-planning scheme to the board, and it has been decided to discuss the matter further in committee. The inspector has approved the tentative proposals of the council as to the area of the scheme.

UNIVERSITY OF LIVERPOOL.

DEPARTMENT OF CIVIC DESIGN.

The Liverpool University Department of Civic Design courses of instruction in the subjects of town planning and housing began last week. The urgent need for a systematic study of this subject need not be emphasised at this moment. It is well-known that the Government intends that half a million houses shall be built during the period of reconstruction after the war, and it is essential that full consideration be given to the best way in which the houses shall be planned, grouped and disposed in relation to existing towns and villages. The Liverpool Department of Civic Design offers facilities for studying these pressing problems by means of a well-equipped library, which includes all current literature bearing on the subject, and courses of lectures, which cover every aspect of the subject, economic, sociological, architectural, landscape, engineering and legal. The first part of the course, leading to a certificate, includes the autumn and Lent terms of this session, and aims at giving a general outline of the subject, accompanied by practical examples worked out by the student. The diploma, which may be taken at a subsequent session, is concerned with original design and advanced study.

The department has recently moved to new quarters, at 61 Ashton-street, opposite the New Arts wing of the university, and ample accommodation will there be found for studio work and private study and research. The composition fee for the certificate course is £6 11s. This includes the following lecture courses: (*a*) Outlines of Town Planning and Housing, by Professor Abercrombie; (*b*) Civic Engineering, by Sydney A. Kelly, F.S.I.; (*c*) Civic Law, by H. Chaloner Dowdall, B.C.L., Barrister at Law; (*d*) Landscape Design, by Thomas H. Mawson; also the use of the studio.

For further particulars as to hours of attendance, &c., intending students should communicate with Prof. Abercrombie, at 61 Ashton-street, Liverpool.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

Vacancy on Urban District Council.—"Fog" writes: A casual vacancy occurs on an urban district council. Will the council be at liberty to co-opt a new member, or must there be an election?

Under sec. 40 of the Municipal Corporations Act, 1882, as applied and adapted to district councils by sec. 48 (4) of the Local Government Act, 1894, an election to fill the casual vacancy must be held, unless it occurred within six months before the ordinary day of retirement of the councillor from office, in which case the vacancy cannot be filled till the next ordinary election. The council have no power to appoint a new member.

Responsibility for Upkeep of River Bank.—"E. H. K." writes: My council have a public footpath running alongside a river bank. Owing to recent heavy rains, the flood water has eaten away the bank, and along with it a portion of our footpath, rendering it dangerous. The owners of land are inclined to repudiate responsibility, stating that as it adjoins a natural stream they are not under any responsibility to repair the river bank. Will you please inform me if this is a correct view, and if so, who is responsible?

In my opinion the landowners are not responsible unless they are liable to repair the footpath *ratione tenuræ*. See *Cheshire Lines Committee* v. *Heaton Norris Urban District Council* (76 J.P., 462). If the path became public prior to the passing of the Highway Act, 1835, the council are *primâ facie* responsible for its repair. If it did not become public till after the passing of that Act the council are not responsible, unless it has been formally dedicated or adopted.

NOTTINGHAMSHIRE'S STEAM WAGONS.

WORKING COSTS.

In his last issued annual report, Mr. J. Cracroft Haller, the county surveyor of Notts, furnishes details of the costs and working of two steam wagons, which were purchased in November, 1915, and July, 1916, for the haulage of road material. The statement shows that the cost of hauling 15,610 tons of material transported by these vehicles was 5·09d. per ton per mile in the case of a "Burrell" wagon, and 5·76d. per ton per mile with a "Clayton" wagon.

These costs, which include 12½ per cent for depreciation, are, Mr. Haller points out, very low, and could not, of course, be kept at this level except by careful organisation. Special daily records are kept of the work done, and it is interesting to note that in the case of the "Burrell" wagon the cost of repairs, tyres, &c., for the year covered by the report has been 17 per cent less than in the previous year.

ROAD MAINTENANCE IN NOTTINGHAMSHIRE.

EXTRACTS FROM COUNTY SURVEYOR'S REPORT.

In his report on the maintenance and improvement of the Nottinghamshire main roads during the twelve months ended March 31st last Mr. J. Cracroft Haller, the county surveyor, records with satisfaction that the whole of the work included in the year's estimates was carried out, including the reconstruction of a further 17 miles of rural main roads, making up to the end of the year a total of 88¼ miles completed of the 90 miles to be carried out under the Road Board Scheme, 1914. Reconstruction work under the same scheme was also carried out on urban main roads, so that at the end of the year there only remained to complete the scheme the reconstruction of 1¾ miles of rural main roads, and work to the amount of £1,455 in urban districts. The estimated cost of the scheme referred to was £96,540 on rural, and £34,418 on urban main roads.

Including the 90 miles of roads dealt with under the 1914 scheme, 175 miles of the 321¼ miles of main roads maintained direct by the county council are now surfaced with Tarmac, either wholly or in the centre, and Mr. Haller thinks that, in spite of the difficulties experienced in connection with labour, materials and haulage, the general condition of the main roads in this county may, under existing circumstances, be considered very satisfactory.

SURFACE TARRING.

During the year 107 miles of the rural main roads were surface tarred, the work being carired out at a cost of 1·65d. per super. yd. In this connection Mr. Haller says: "The importance of surface-tarring work, particularly under present conditions, when labour and materials for work of repairs or resurfacing are so difficult to obtain, cannot be placed too high. There is no doubt that if this work had not been extended during the last three years many of the roads would be to-day in a much worse condition than they are at present. As an instance, the Nottingham and Grantham road for a distance of 5 miles was surfaced with Tarmac from twelve to fourteen years ago; in 1915 there were unmistakable signs that this road must shortly be resurfaced, but by at once taking steps to have the whole road surface tarred and renewing this each year since it has been kept in a very fair condition, and although it will be necessary to resurface this road shortly, there has been up to now three years of life added to the road at a very small cost.

ROAD MATERIALS.

As compared with a total of 81,525 tons of road material required, only 52,442 tons was allotted to the county by the Control Committee; it was therefore obvious that unless some steps were taken to obtain other supplies that there would be a serious shortage of material for scheduled roads, to say nothing of the entire absence of material for non-scheduled roads. "In this county," says Mr. Haller, "we are fortunately situated as regards slag, there being thousands of tons of this material lying in huge heaps at works on our boundaries. A scheme was therefore prepared for obtaining supplies of slag to augment the supplies granted by the Control Committee, and an arrangement was entered into with the Stanton Ironworks Company, Limited, for a lease of one of their slag crushing and screening plants, which was standing, owing to shortage of railway wagons and labour. This scheme entailed providing our own railway wagons for transport and finding the necessary labour for handling the material; these difficulties have been surmounted and with careful selection a very useful amount of additional slag has in this way been obtained at a cost of not more than that of other slag purchased. A portion of this material has been supplied to highway authorities within the county. A scheme for the transport of material by road and water for use on non-scheduled roads has been approved by the Control Committee, and although the quantity of material is limited, it is of great assistance to the authorities concerned."

DAMAGE TO ROADS BY TIMBER HAULAGE.

As in many other counties, timber-hauling traffic in Nottinghamshire has increased to proportions previously unknown. During the year intimations were received that timber was being felled in the county to the extent of over 70,000 tons, and, Mr. Haller says, it may be taken roughly that at least three times that quantity represents the tonnage of this traffic put on roads in the administrative area, a large proportion of which are county main roads. This means that in a period of about two years some 210,000 tons of traffic, comprising practically every means of haulage, from traction engines and steam and petrol motor lorries down to ordinary carts, is being put on to local roads confined to a few centres. On one main road the timber hauled for some time was 90 to 100 tons per day, and on another, one traction engine, one tractor, forty motor wagons and sixty timber drags have made journeys daily, with loads varying from 10 tons to 1½ tons, for the whole of the year. Having regard to this information, it is not surprising that in many instances the damage done to the roads is considerable.

Mr. Haller expresses regret that, up to the present, no satisfactory scheme has been inaugurated whereby the liability for the damage can be fixed on the responsible parties. Ninety-five per cent of the timber is for national purposes, but the Treasury has so far declined to accept the responsibility for making good damaged roads, except those damaged by traffic conveying timber on behalf of a direct Government Department, it being left for highway authorities to take proceedings on the ground of extraordinary traffic against the person by or in consequence of whose order the traffic has been carried on. This, the county surveyor points out, would undoubtedly result in more money being expended in taking legal action than would be recovered.

"Still another department," Mr. Haller observes, "has been set up by the Government under the Defence of the Realm Act. Hauliers are now required to give notice to county surveyors of any timber haulage proposed, and certain military officers have been appointed, with power to determine the route over which the traffic shall be taken. This scheme is now, however, being reconsidered, and it is hoped that the result will be more satisfactory to highway authorities, and that a clear statement will be made as to how far the Government will, or will not, accept responsibility for making good the damage done to roads by the haulage of timber for national purposes."

STEAM ROLLERS.

It has been necessary to hire steam rollers to carry out work in addition to that done by our own rollers. The cost of the rollers per day has been £1 6s. 3d., as against £1 2s. 3½d. in the previous year, which is accounted for by the higher cost of coal, oil, wages, &c. The quantity of material consolidated was, however, an average of 31 tons per day per roller, as against 27 tons in 1916-17. This is a record for the county, in spite of the difficult circumstances of present times.

ESTABLISHMENT CHARGES.

The total amount of establishment charges for the year, including salaries, allowances to staff on active service, travelling expenses, stationery, &c., was £2,319, being 2·8 per cent of the total expenditure during the year.

GRAVEL HEAPS ON ROADSIDES.

AN UNSUCCESSFUL PROSECUTION.

The county surveyor of Norfolk, Mr. W. W. Gladwell, was summoned at Terrington Petty Sessions recently for "unlawfully placing certain gravel heaps upon Station-road, Terrington St. Clement, to the personal danger of persons travelling." The prosecutor, Mr. J. Newcome Wright, J.P., who was stated to be chairman of a district council, complained that about forty or fifty heaps of gravel had been placed in the road for several weeks, and he contended that these were dangerous, and that "they ought never to have been placed in an illegal position." In cross-examination, he said he had not been hurt himself, and did not know anybody who had been hurt, but "he went in deadly fear of the heaps." He knew nothing about the practice of county councils placing by the side of the road the materials required for the repair of the roads. He knew as a fact that his own council did this. He did not know as a fact that the gravel heaps had been twice inspected by the county surveyor, who found that they had been properly placed on the grass verge.

It was submitted for the defence that the prosecution necessarily failed because the county surveyor, as was admitted by the prosecutor, did not cause wilful obstruction, and the bench decided that there was no case. It was stated that the county council had the borough surveyor of Lynn and several expert witnesses in attendance, but the magistrates declined to allow costs. The width of the grass verge on the west side of the road, where the material was laid, is 7 ft., and the width of the path on the east side of the road 7 ft., while the metalled surface of the roadway is 19 ft. wide.

New Works Regulations.—An Army Council Instruction (1,088) states that, in view of the present position regarding man-power and supply of material and fuel, the War Cabinet has recently ordered that the War Priorities Committee should issue instructions that no new works shall be started except such as are immediately necessary for winning the war, and that any exceptions to this rule shall be brought to the notice of the committee. The criterion whether a new work is directly necessary for winning the war is to be rigorously applied by those concerned, in every case, before requisitions for work are put forward. The Army Council considers that the only practical way to apply the orders of the War Cabinet is to exercise very careful discrimination between demands and real needs; anything and everything in the way of convenience, as apart from necessity, must be ruthlessly cut out of every programme that involves building.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Bedale R.D.C.—It has been agreed to purchase a site for an isolation hospital.

Bedford T.C.—The town council have confirmed the recommendation of the Electricity Committee for the extension of the boiler house at the generating station, at an estimated cost of £14 390.

Blackpool T.C.—The Health Committee are considering a scheme for building a sanatorium for consumptives at Staining.

Newport (Mon.) T.C.—With respect to the reconstruction of Newport Bridge, it has been resolved to apply to Parliament to extend the period for compulsory purchase of properties and the period for carrying out the work.

Sheffield T.C.—The city council are seeking powers to erect a public hall for the city. Alderman Sir William Clegg stated that they hoped to secure a site which was near the Albert Hall, had a frontage to Barker Pool, and extended along Holly-street and Orchard-lane, and was estimated to consist of about 4,500 yds. It was only possible to obtain the land by a Parliamentary Bill.

REFUSE COLLECTION AND DISPOSAL.

Accrington T.C.—The town council have resolved to purchase a one-turbine centrifugal machine for extracting fat from refuse at an estimated cost of £230.

Colwyn Bay U.D.C.—It was stated that last month 4 tons of waste paper was despatched for repulping. The collection of paper is undertaken voluntarily under the auspices of the Health Committee, and all the proceeds from its sale are divided between local charities.

East Cowes U.D.C.—A committee has been appointed to choose a site for a refuse destructor.

ROADS AND MATERIALS.

Ambleside U.D.C.—The council have approved a scheme for the purchase of a stonebreaker and gas engine, for the breaking of their road stone. The surveyor, Mr. H. W. Rigg, estimated the initial cost of the installation at £500, and pointed out the increasing difficulty which had been met with in obtaining labour to break stone by hand.

Conway R.D.C.—The surveyor, Mr. R. Hughes, reported that the roads used by the timber hauliers were in a shocking condition. In accordance with the council's instructions, he had stopped the work of putting the roads in order until the Road Board, who are now responsible for the amounts expended on the extra maintenances, had paid instalments which were long overdue. The surveyor's report as to the bad state of the roads is emphasised by the fact that three of the timber hauliers' tractors are firmly embedded in the mud on the Bryuymaen and Llanrwst-road.

Halstead R.D.C.—A discussion took place with regard to the price to be paid by owners of land for pit stones for the repair of the roads, it being thought that the amount nowadays demanded in some cases was too high. A fear was expressed by several members that if they did not agree to the owners' terms the latter would refuse to sell their stones, but the clerk stated that the council had power to take whatever stones they required from any pit within their area and leave it to the justices to assess the damages.

Llangollen U.D.C.—It was reported that, upon the roadmen making application for an increase of wages and threatening to resign unless they received it, the council agreed to accept their resignations on the understanding that the men went to forms of useful service. They had gone to work either on the land or at timber-felling, and the council had since only been able to obtain the services of a woman and an old-age pensioner. However, the council were now receiving applications from men who had been in the forces which were under consideration.

Newport (Mon.) T.C.—It has been agreed to purchase for £2,000 the leasehold interest of properties at the corner of East Usk-road and Carelton-road, for the purpose of widening East Usk-road.

Perthshire C.C.—The Blairgowrie District Committee have resolved to dispose of an old stonebreaker, and to purchase a modern machine.

SEWERAGE AND SEWAGE DISPOSAL.

Lowestoft T.C.—The borough surveyor, Mr. G. H. Hamby, has received instructions to prepare plans and estimates for the renewal of the sewer outfall.

New Romney T.C.—The town council have instructed the medical officer of health to prepare a report upon the sewage disposal scheme at Littlestone.

Reading T.C.—With respect to the complaints of smells from the sewage farm, a report was submitted from a special committee stating that for some time past the sewage had been treated with chloride of lime, at a cost of £182. The council resolved to continue the treatment until further order. As regards the complaint of the Thames Conservancy of the bad samples of effluent obtained from the farm, it was decided to increase the irrigation area. It was also decided to ascertain whether there is any possibility of the council obtaining the further approval necessary to enable them to carry out at the present time the construction of the sedimentation tanks and other works which Mr. G. Midgley Taylor recommended them to undertake, and which had been postponed in consequence of the Government's restrictions on borrowing.

WATER, GAS, AND ELECTRICITY.

Croydon T.C.—In making reference to the town council's successful opposition to certain clauses of the South Suburban Gas Bill, Councillor Peet, on behalf of the Lighting and Electricity Committee, expressed his admiration of the very excellent manner in which the borough engineer, Mr. G. F. Carter, had conducted the opposition. He it was who gave the evidence which turned out so successfully. The committee felt that the opportunity should be taken of expressing in public their admiration for his work.

Malton U.D.C.—The council have agreed to cut the water off at the main each night at 10.30 until 6 o'clock on the following morning in order to save coal in pumping.

Sheffield T.C.—The general manager of the waterworks, Mr. William Terry, has submitted details of the new pumping scheme by which it is proposed to pump back such daily quantities of river water as may be required from time to time from a point below Messrs. Steel, Peech and Tozer's works, to a site adjoining the sewage disposal works, where it will be efficiently filtered and treated. The purified river water will then be lifted, by means of high lift pumps, through a main laid along the public roads and existing easements into a balancing reservoir to be constructed at the foot of Damflask embankment, and from thence discharged through the statutory mill gauge in substitution for an equivalent quantity of the Loxley compensation water now being delivered out of the reservoir. A branch pipe will be laid along the Rivelin Valley-road as far as Walkley Bank Tilt to supply the proportion of the Rivelin compensation. The object of this re-use of the river water for compensating purposes is to enable the corporation to retain an equivalent quantity of pure water in the reservoirs for the supply of the city and districts. The cost of the works to be provided by the corporation is estimated at £350,000. It is stated that the Ministry of Munitions is withholding sanction to a portion of Sheffield's scheme for the extension of its electricity works because it conflicts with the proposals to establish great national power stations.

Worcester T.C.—The town council have approved the recommendation of the Electricity Committee to purchase the site of Bransford Mill for £355 for the purpose of converting the water power.

MISCELLANEOUS.

Barnstaple R.D.C.—The Sanitary Committee reported inability to find candidates for the post of temporary sanitary inspector, and it was decided to invite the Local Government Board's services in securing release from the Army of Mr. Barlow, the council's permanent inspector.

Crompton U.D.C.—The horse-keeper reported that it had cost 25s. 1½d. per horse per week to keep the horses of the council during the month, against 25s. 9d. in the previous month. The clerk reported that the system of collecting food for pigs was in progress, and so far it had worked all right. They were getting as much as they could use.

Leeds T.C.—The Tramways Committee are seeking powers to construct a tramway through Hawksworth Wood estate, and from Dewsbury-road to the Middleton town-planning area.

Ripon T.C.—A scheme has been agreed to for establishing a national kitchen on spare ground behind the Wakeman's house.

St. Helens T.C.—The Tramways Sub-Committee have been authorised to negotiate with the tramways company for an extension of the lease of the undertaking for a period not exceeding five years. The lease of twenty-one years expires in October next year.

Southampton T.C.—It has been decided to establish the municipal piggery at St. Denys sewage farm, to build twelve sties, and to make provision for further accommodation.

Stoke-on-Trent T.C.—Subject to the condition that the team owners undertake to employ only able-bodied men, and to pay such men the full standard rate of wages, the town council have approved the following revised rates for haulage: One horse, cart and driver, 26s. per day, Monday to Friday, 20s. for Saturday; two horses, carts and driver, 49s. 6d. per day, Monday to Friday, 37s. 6d. for Saturday (tonnage rates and odd work to be assessed accordingly).

Torquay T.C.—Signs of the economic prosperity of the town are suggested by the fact that the town council have only levied an increased rate of twopence. Not long ago £5,000 was debited against the Pavilion, and a special rate was then proposed to wipe off the balance. Last year this balance was reduced to £2,015, and since then this balance due to the treasurer has been wiped off. Consequently no sum is needed by the Entertainment Committee out of the general district rate. Instead of having £1,580 voted, the waterworks undertaking does not require anything, while the baths contribution was reduced from £1,000 to £500.

Tottenham U.D.C.—The Food Controller having sanctioned the opening of a national kitchen for the district, the council have resolved to make application for a loan of £626 for establishing a kitchen at Down-lane.

Worthing T.C.—With reference to the proposed works to the groynes after the war for certain defence works, a letter was read from the Local Government Board sanctioning the borrowing of £2,300 by the council.

PERSONAL.

Mr. C. R. Swaries, Burgh Engineer's Office, Motherwell, has been elected a member of the Royal Sanitary Institute.

Mr. Foreacre, engineer and surveyor to the Plympton Rural District Council, has received a war bonus of £50 a year.

Mr. M. F. Theiney, assistant county surveyor of Clare, has been elected a member of the Royal Sanitary Institute.

Mr. Charles Hall, surveyor to the Droylsden Urban District Council, has been appointed architect for the council's housing scheme.

Mr W. Turner, surveyor to the Chepstow Rural District Council, has had his salary increased from £120 a year to £3 per week.

Mr. George W. Thompson, surveyor to the Hipperholme Urban District Council, has, we regret to state, received news that his son, Corporal Ernest W. Thompson, West Riding Regiment, was killed in action on September 29th.

Mr. Arthur Colborne, surveyor and inspector of nuisances to the Amesbury Rural District Council, who has recently been discharged from the Army, has been appointed temporary surveyor to the Yiewsley Urban District Council.

Mr. S. A. Hill-Willis, engineer to the Tilbury Urban District Council, has been voted an increase of salary, making the total salary received as engineer to the council and joint resident engineer to the Thurrock, Grays and Tilbury Sewerage Board £445 a year.

Captain Latham, borough surveyor of Penzance, requested the town council to release him from his duties in order that he might, as an ex-Engineer officer, be appointed for instructional purposes on the lines of communication in France. The town council, however, have approved the report of the General Purposes Committee, in which they regret that they could not recommend that the request should be acceded to, and the Mayor (Alderman Geo. Poole) said they felt that they were doing a kindness to Captain Latham by keeping him at home. Their surveyor had seriously suffered through service in France, and they thought that if he went back the town might not be able again to have the advantage of his services.

OBITUARY.

Mr. H. W. Wilson, who held jointly the offices of surveyor to the Bulkington Urban District Council and the Nuneaton Rural District Council, died suddenly, we regret to state, at the early age of thirty-four. He also held appointments in connection with a local War Agricultural Committee and Food Control Committee, and had in hand water and sewage schemes for local authorities.

Insurance Note.—A provisional agreement for amalgamation has been entered into between the Eagle, Star and British Dominions Insurance Company, Limited, and the English and Scottish Law Life Assurance Association. Upon the agreement becoming absolute, the assets of the Eagle, Star and British Dominions Insurance Company, Limited, will amount to £16,611,961 and the premium income will exceed £3,665,000.

MOTORS AND MUNICIPAL WORK.

Cookham Rural District Council are considering the purchase of a motor tractor.

Taunton Town Council have referred to the Health, Streets and Highways Committee for further information a proposal to apply to the Local Government Board for sanction to the borrowing of £1,300, for the purchase of an electric haulage vehicle.

Manchester Health Committee propose to purchase a Ford motor, costing £250, from Messrs. Lookers, of Manchester. The Gas Committee of the city council have accepted the tender of Mr. Gerald Dugdale to supply a Renault motor van at a cost of £225.

It was explained at the Lewisham Borough Council by Alderman Jackson that gas was discarded as the motive power of the council's motor car because the Petrol Committee (of the Board of Trade) refused to sanction its use if any petrol was used, and it would be impossible to work the car on gas only. The cost of converting it into a gas-driven car was £43 3s. 6d.; the cost of laying mains and providing garage accommodation in two of the council's yards was £28 2s., and the cost of dismantling the gas apparatus was 10s. No action had yet been taken with regard to the dismantled parts, but it was not intended to scrap them. The time would probably come when there would be no prohibition on the use of gas with petrol, and the Works Committee would then revert to the use of gas, which was more economical.

MOTOR TRAFFIC TEST CASE.

The General Committee of the Commercial Motor Users Association has decided to provide the necessary funds to carry to the House of Lords the test action for alleged extraordinary traffic damage to roads raised by the Weston-super-Mare Urban District Council against the well-known quarry owners in the district, Messrs. Henry Butt & Company, Limited, members of the association.

The claim in this test action was for £1,750, and Mr. Justice Eve gave judgment for only £200, but the importance of the issues at stake in relation to future developments of road transport constitute the case one which must be taken to the House of Lords for a final ruling.

The points of interest on the issue are as follows:—

(1) Whether or no the change from horse to motor haulage for the conduct of the same traffic is to be admitted a ground for making an extraordinary traffic claim.

(2) The correctness of the judgment by Mr. Justice Eve, having regard to the fact that the learned Judge himself found that the whole of the operations were in connection with an industry well established in the neighbourhood, and carried out in precisely the same way as that adopted by other quarry owners in the district, and that the wagons were good ones, and not overdriven nor materially overloaded.

The defence is in the hands of Mr. W. Joynson-Hicks, M.P.

Housing and Town Planning at Tilbury.—At the last meeting of Tilbury Urban District Council instructions were given for No. 1 scheme of town planning, including part of the Orsett rural area on the eastern side of Tilbury in addition to the whole of the South Ward north of the Tilbury Docks, to be proceeded with forthwith, and with regard to No. 2 scheme, Mr. Ernest Allen, M.T.P.I., in conjunction with the council's engineer and surveyor, Mr. S. A. Hill-Willis, M.INST.C.E.I., was instructed to prepare a supplementary scheme for the town planning of the North Ward portion of the urban district. With regard to a further extension of the recently completed housing scheme, after further discussing the recent visit of the inspector from the Local Government Board, the council unanimously resolved that a definite scheme for the provision of a further 1,000 houses in the urban district be put forward in addition to the balance of fifty-four left over from the South Ward portion of the original scheme, the latter to be varied in accordance with the Local Government Board's suggestion to include an additional bedroom; further, that the whole of such extended scheme be carried out immediately after the war, so as to qualify for the financial grant in aid agreed to be made by the Treasury towards such schemes. It was also resolved that the 1,054 additional houses so to be provided be erected as to 250 on the hills in the North Ward, and as to the balance of 804 near the docks in the South Ward. It was decided that the architects, Messrs. Ernest G. Allen, F.R.I.B.A., F. J. Winter, M.S.A., and W. J. Wadman, in conjunction with the council's engineer and surveyor, Mr. S. A. Hill-Willis, be requested to prepare new lay-out plans for the whole of the houses to be provided under the extended scheme, and that such plans be submitted for approval to a special meeting of the Housing and Town-planning Committee to be convened for that purpose as soon as the drawings are ready.

Compression Tests of Concrete.—A writer in *Beton und Eisen* for June 4th says there is a tendency observable to substitute for the former practice of relying upon the richness of the material in cement a test of the amount of the load which the concrete will take in compression after, say, a period of six weeks. Thus the figure assumed in Germany is 2,560 lb. per square inch, in Hungary 2,275 lb. per square inch, and even 2,844 lb. per square inch in four weeks in Switzerland. It is shown that this mode of estimating the value of concrete may, unless due precautions are taken, involve a serious source of error, and that it is much more prudent to take the tensile and bending tests of the cement into account. The Austrian rules take three sets of tests as a basis and give a much lower figure, which varies in accordance with the composition of the concrete from 1,422 lb. to 711 lb. per square inch. In order to ensure reliability in concrete structures a safe load, in which the ascertained total load is divided by 4·5 or even by 6, in the case of inferior concrete, is assumed; but there is a danger in this latitude, the factor of safety. The author indicates these facts in the form of a graphic diagram.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

TEMPORARY WATER INSPECTOR.—October 22nd.—Loughborough Town Council. 38s. per week, with 7s per week plus 10 per cent war bonus.—Mr. Albert H. Walker, borough surveyor and water engineer, Town Hall, Loughborough, Leicestershire.

ASSISTANT INSPECTOR OF NUISANCES.—October 22nd.—Chorley Town Council. £150 a year.—Mr. J. Mills, town clerk, Town Hall, Chorley.

SURVEYOR'S AND INSPECTOR'S ASSISTANT.—October 25th—Newmarket Urban District Council. £2 to £3 per week, according to qualifications.—Mr. William H. Eley, engineer and surveyor, Town Hall, Newmarket.

SURVEYOR'S CHIEF ASSISTANT.—November 2nd.—Middleton Town Council. £150 a year.—Mr. J. P. Walmsley, town clerk, Town Hall, Middleton.

CHIEF ENGINEER.—October 25th (in England), December 10th (in Calcutta).—Calcutta Corporation. 2,000-2,500 rupees per month.—Mr. S. W. Goode, c/o H. S. King & Co., 65 Cornhill, London, E.C. (for England), and the Secretary to the Calcutta Corporation, Municipal Office, Calcutta (for Calcutta).

CONSULTING ENGINEER.—Union Government of South Africa.—The High Commissioner for the Union of South Africa, 32 Victoria-street, London, S.W.

SANITARY INSPECTORS.—Medical Department of East Africa. £200-£250, with a uniform allowance of £10.—The Crown Agents for the Colonies, 4 Millbank, London, S.W. 1.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

WIGAN.—October 21st.—For the construction of a concrete and brick culvert at the electricity works.—Mr. R. B. Donald, borough engineer, King-street West, Wigan.

Engineering: Iron and Steel.

BATTLE.—October 19th.—For sinking a well.—Mr. F. C. Shepherd, clerk, Urban Council Offices, Battle, Sussex.

LONDON.—October 23rd.—For the supply of cold-water pipes and accessories and steam fittings.—The Controller of Supplies, H.M. Office of Works, King Charles-street, Westminster, S.W. 1.

CHELMSFORD.—October 24th.—For the provision of a boiler for the heating apparatus at the public library.—Mr. P. T. Harrison, borough engineer, Municipal Offices, Chelmsford.

Sanitary.

JOHANNESBURG.—January 8th.—For the supply of 5,000 sanitary pails with eyelet holes and lids for the same.—Department of Overseas Trade (Development and Intelligence), 75 Basinghall-street, E.C. 2.

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH
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EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet.
Mr. SAMUEL HUTTON, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED
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Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.
Works: STRANTON WORKS, WEST HARTLEPOOL.

Miscellaneous.

HERTFORD.—October 19th.—For the supply of oil, waste, water fittings, brooms, shovels, manhole covers and gully grates.—The Borough Surveyor, The Castle, Hertford.

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ENGINEERING FITTER required at the Air Compressing Station, Westfield, Gosport.—Application (on forms to be supplied, with other information) to be delivered at the Office of the Surveyor, Urban District Council, Gosport, not later than noon, October 14th. (3,886)

ASSISTANT SURVEYOR and DRAUGHTSMAN wanted for two or three months, to revise Ordnance Maps in connection with Town Planning, in the North of England.

Apply with testimonials, stating age and salary required, to Box 1,672, Offices of THE SURVEYOR, 24 Bride-lane, Fleet-street, E.C. 4. (3,892)

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Applications are invited for the above appointment in candidate's own handwriting, stating qualifications and experience.

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Applicants to be ineligible for Military Service, and copies of two recent testimonials are to be sent with application, not later than the 25th inst., to the undersigned, from whom further particulars can be obtained.

(Signed)
WILLIAM H. ELEY, ASSOC.M.INST.C.E.,
Engineer and Surveyor.

Town Hall,
Newmarket.
October 14, 1918. (3,893)

PREPARATION FOR EXAMINATIONS.

COMPLETE COURSES OF PREPARATION for the Examinations of THE SURVEYORS' INSTITUTION, THE INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS, &c., are conducted by Messrs. PARRY, BLAKE & PARRY, who will be pleased to send full particulars or to give any advice with respect to the Examinations.

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SCHOOL OF ARCHITECTURE.

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Professor of Civic Design:

L. P. ABERCROMBIE, M.A., A.R.I.B.A.

The department provides a training for Architects and Engineers who wish to specialise in Town Planning. The courses lead to a Certificate and Diploma. The session consists of the Autumn and Lent Terms. Autumn Term begins on October 7th.

Prospectuses of day and evening classes may be obtained on application to the Registrar of the University.

EDWARD CAREY, Registrar.

(3,884)

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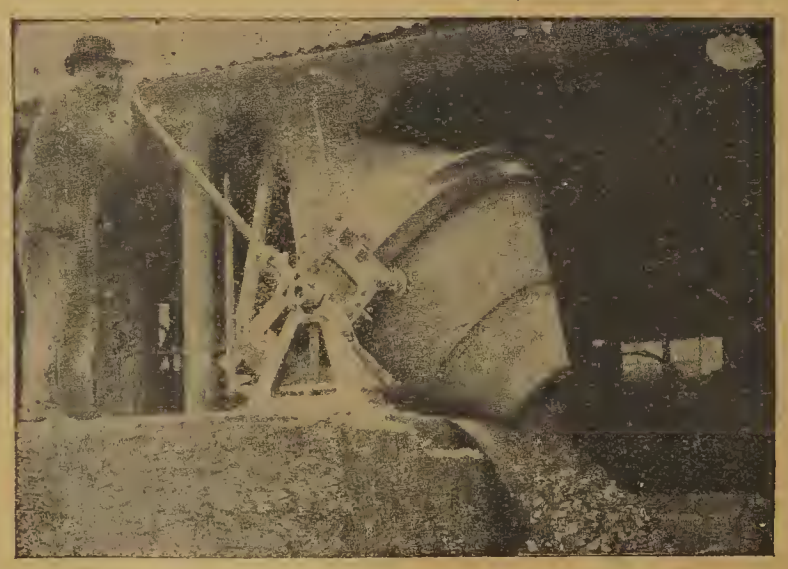

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KINGSWAY, W.C. 2.

The Surveyor

And Municipal and County Engineer.

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Minutes of Proceedings.

Sewage Disposal.

It seems a very long time since the reports of the Royal Commission on Sewage Disposal were discussed in these columns at frequent intervals, and it would cause no surprise if, in the stress and strain of the past four years, such matters as the recommendations of a deferred Royal Commission should be forgotten. It is therefore very interesting to learn from an article in the September issue of the *Times Engineering Supplement* that the labours of the Royal Commission have not been entirely in vain, and that at least one scheme of sewage disposal put into operation during the war has been designed on lines based upon some of the work done by the Royal Commission. This scheme was arranged with the object of purifying the sewage only to the extent necessary to prevent actual nuisance arising from its discharge, on the principle laid down in one of the recommendations of the Royal Commission. Under the conditions available it was found possible to do this without incurring the expense of filters, by adopting the method of disposal known as dilution, and in this way a large sum was saved. The sewage disposal works include settlement tanks of a special form, chlorinating plant and other details, and the tank effluent is then discharged direct into a river which is of such volume and quality that the final purification is brought about by the oxygen in the water. It is obvious that rivers of this character are seldom available in this country, and that sewage disposal by this method is possible in only a few cases. It is, however, interesting to find that the work done by the Royal Commission in connection with the self-purification of rivers and the results recorded in their reports are fully confirmed by the results obtained in the case mentioned, and there are possibly some places for which new disposal works, or extensions to existing works, will be required after the war, where the authorities may be glad to take advantage of the possibilities offered by such a scheme. An interesting feature of the scheme is the means adopted for facilitating the disposal of the sludge. Briefly, the sludge is retained in deep tanks for three to four weeks, in which period it undergoes complete digestion, and is then drawn off and dried on specially constructed open draining beds. From the description it appears that by this method the sludge is brought into a suitable condition for removal in carts in a comparatively short time. Other interesting results are that no trouble is experienced with scum, and no objectionable odours are created. We take this opportunity of expressing our appreciation of the opening of the columns of our influential and widely-read contemporary to matters which are of much greater importance to the health of the country than is generally understood. When the importance of this branch of engineering is fully recognised there will be some hope that the value of the work done by municipal engineers will be acknowledged and their status improved. An opportunity for action in this direction will occur in the forthcoming formation of a Ministry of Health. The medical profession will naturally take an important part in this new State department, but it will not be properly or fully constituted unless municipal engineers and, indeed, all sanitary engineers are included in its scope, to the extent at least of ensuring that only thoroughly qualified engineers shall be employed on such work. In the case of municipal engineers, steps should be taken to grant them security of tenure of office, and local authorities should be led to understand that the municipal engineer is the technical adviser of his council and not merely a servant who is called upon to do the bidding of every individual member. If the *Times Engineering Supplement* would use its great influence to further these objects, it would be doing much towards securing perfection in the sanitary conditions of our towns and villages.

Superannuation.

The appointment by the President of the Local Government Board of a committee to inquire and report as to superannuation for municipal officers constitutes the most distinct advance which has been made with regard to this important matter since it was first agitated—we hardly care to say how many years ago. The present position is not only inequitable as between municipal officers and other more favoured sections of the public services, but it is also hopelessly illogical owing to the existence of a number of special Acts of Parliament by which certain boroughs have superannuation schemes in being, while the great majority of officials with equal claims are still awaiting this measure of justice. This was fully recognised by Mr. Herbert Samuel—then President of the Local Government Board—as long ago as 1914, when as the result of a deputation he communicated with the Associations of Municipal Corporations, County Councils, Urban and Rural District Councils. We then assumed that a special committee would be set up; but presumably owing to the diversion of the energies of the Board to war work, it has been left to Mr. Hayes Fisher to take this step. The precise reference to the committee is to consider whether it is desirable to introduce a scheme of superannuation applicable to the persons in the employment of local authorities in England and Wales, and, if so, to make recommendations on the subject with special reference to (*a*) the finance and general working of any such scheme. (*b*) classes of officials or employees it should embrace, and (*c*) its relation to any existing superannuation scheme. The committee is constituted as follows:—Mr. R. C. Norman (chairman of the London County Council), Mr. John Boggan (Urban District Councils Association), Sir Arthur W. Chapman (County Councils Association), Mr. Arthur Collins (city treasurer, Birmingham), Mr. W. R. Davies (Board of Education), Mr. W. P. Elderton (Institute of Actuaries), Rev. R. V. O. Graves (Rural District Councils Association), Sir H. Haward (controller, L.C.C.), Mr. Charles Knight (Local Government Board), Mr. Harry List (Poor Law Unions Association), Mr. E. R. Pickmere (town clerk, Liverpool), and Sir Alfred W. Watson (Government actuary). It will thus be seen that it has on the whole a representative character, although it might perhaps have been advisable to include a municipal engineer, particularly as the question of extending superannuation benefits to all classes of employees is bound to arise. We only hope that the committee will complete its labours at the earliest possible moment, and that it will succeed in evolving a scheme which will commend itself to the judgment of the Government and Parliament.

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Aberystwyth Council and the Office of Surveyor.

We notice that the Aberystwyth Rural District Council have filled the vacant position of surveyor by appointing a candidate who is described as a carpenter. There were thirteen applicants for the position, including several discharged soldiers—the successful candidate belonged to the latter category—and the choice lay between carpenters, masons, plasterers, and three roadmen. None of the roadmen happened to be discharged men. In the course of the proceedings letters were read from the Discharged Soldiers' and Sailors' Branch, and the Pensions Committee, advocating the appointment of discharged men. The secretary of the Pensions Committee stated in his communication that the committee would view with grave concern any departure from the practice of engaging discharged men, "if competent," and would consider it their duty "to investigate any apparent neglect." One member of the council appears to interpret this into a "covert threat," and

another was constrained to suggest that discharged soldier candidates would stand a better chance if there was less dictation. This aspect of the matter is one for councillors themselves to thresh out. The aspect that appeals to us is the possible unfitness of a candidate described as a carpenter to undertake efficiently the duties of a surveyor, with the special qualifications these imply at a time when road work and problems of road construction may be described as of more than normal importance. The duty of finding employment for discharged soldiers is one which will be universally recognised and acted upon in the most sympathetic spirit, but obviously the remedy will be worse than the trouble if it is carried out without discrimination, or by placing square pegs in round holes from motives of sentiment or philanthropy.

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A New Housing Bill.

In connection with the great Government scheme of after-war housing, it was announced some time ago that means would be secured for providing for the erection of houses in those districts which would not fall into line. This involves legislative action, and last week the necessary Bill was introduced. The expressed effect of the Bill, which applies only to England and Wales, is to give *county* councils further powers for the provision of houses for the working classes, and the principal operative section is that which empowers the Local Government Board during the war and for twelve months afterwards to authorise a county council to provide houses for the working classes where a local authority within the county has not taken adequate steps under existing legislation to do so. This clause is upon lines which had been generally anticipated; but it remains to be seen whether it will be effective in operation. Hitherto, in certain parts of the country at all events, the county councils have been at least as backward in their general outlook on local government administration as have their constituent local authorities. The Bill as drafted may, and we hope will, prove to be effective; but we should like to see some method devised for securing the desired end in case even a county council should prove recalcitrant. The Bill further provides for increasing to eighty years the maximum period for the repayment of money borrowed by a county council to provide dwellings for persons employed by it—an increase which might well be made to apply to housing generally.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

CONCRETE ROADS.

To the Editor of The Surveyor.

Sir,—An interesting commentary on this subject is furnished by the many applications which I have received from all parts of the world for copies of the report on "The Present Position and Possible Future of Concrete Roads," recently prepared for the Roads Improvements Association by Mr H. Percy Boulnois, M.Inst.C.E. In addition to a very large circulation of the report in the United Kingdom, numerous copies have been applied for by road engineers and public authorities in France, Belgium, Norway, United States of America, Canada, British Columbia, Brazil, Argentine, West Indies, India, Ceylon, Malay States, Australia, New Zealand and British East Africa. To judge from most of the letters received from these countries it is very pleasing to learn that a keen interest is undoubtedly being taken in the subject of concrete roads, and that possibly in the various schemes of road development now under consideration this special form of road construction will receive the careful attention of those responsible for their design. To quote from two letters received from New Zealand will show that this is actually the fact:—

1. "The city council of —— have decided to lay down several roads in this way within the next twelve months. It is also a matter giving considerable thought to engineers in country districts."

2. "Practically nothing has been done in the way of putting down the main roads in New Zealand in concrete; but there will be a great agitation for something of the kind after the war."

Just one other extract from a letter received from India may be given which would seem to indicate that there are cases where the construction of concrete roads might be most desirable:—

"I am greatly interested in this subject, and have to deal with roads liable to be swept away and to be under water for several months in the year."

I have quoted the above extracts as I think they may be of interest to your readers.—Yours, &c.,

James D. Haworth,
Acting Secretary, Roads Improvement Association.
15 Dartmouth-street, Westminster, S.W. 1.
October 21, 1918.

TAR-MACADAM v. TARRED SLAG.

To the Editor of The Surveyor.

Sir,—Whilst there is no shadow of doubt that manufacturers of tar-macadam have not as a general rule shown exceptional foresight in this matter, as a matter of fact it is also true that, with some notable exceptions, highway surveyors have not in the past given much encouragement to manufacturers of a first-class tar-macadam. It is the almost universal rule that highway authorities will purchase the cheapest article when several firms are tendering for tar-macadam. It seems to be overlooked that price is not everything with a manufactured article, but it is certain that when one can buy tars at prices varying from 2½d. to 6½d. per gallon the cost of the manufactured article must vary considerably. There is increasing evidence, especially with county surveyors, who are given a great amount of freedom in purchasing road materials, that they are willing to give tar-macadam a fair trial if the manufacturer can satisfy them that they really understand what goes to make a really first-class road material. It is with the urban and rural councils that one is told that Jones's price for tar-macadam is cheaper, and when Jones's stuff (perhaps made with gas tar undistilled and taking pot-luck as to the dryness of the stone) proves a failure, the council condemns tar-macadam outright. Surveyors require a liberal education in this matter equally with quarry owners.—Yours, &c.,

Manufacturer of Tar-Macadam

October 10, 1918.

[The matters with which our correspondent deals were the subject of a paper read at a recent meeting of the Quarry Managers' Association and reproduced in our issue of the 4th inst., p. 159.—Ed. The Surveyor.]

COB BUILDING.

To the Editor of The Surveyor.

Sir,—Your correspondent Mr. W. N. Whitaker advocates the cob wall method of construction for dwelling houses. It is true that in the Devon district mentioned there are large numbers of cob cottages; but one would hardly consider them ideal places of residence.

Mr. Whitaker says: "I can see in it nothing contrary to the Model By-laws." It would be interesting to learn how he arrives at that conclusion. I am sure the fraternity of Mr. Joseph Briggins would welcome such an interpretation of the by-laws with which to floor the building inspector when caught in the use of improper material.

The statement, "nor, if properly constructed of clean earth, nothing objectionable from a sanitary point of view," seems open to question. The soft and friable nature of the cob would afford an excellent harbourage for rats and other vermin, and thus appears to be an undesirable material for the construction of modern dwellings.—Yours, &c.,

Building Inspector.

SUPERANNUATION.

To the Editor of The Surveyor.

Sir,—I notice by the papers that the Teachers' Superannuation Scheme has been introduced into the House of Commons by the Education Minister, and a good scheme it appears.

Is not now the time for other local government officials to get their proposals before the House, or will the chance be missed? Perhaps the two institutions have already done so, but I have read nothing about it in the Press.—Yours, &c.,

Capoc.

October 18, 1918.

[Since the above letter was written, the Local Government Board, as stated in another column, have announced the appointment of a committee to report as to the desirability of introducing a scheme of superannuation for municipal officers.—Ed. The Surveyor.]

Bridlington Improvements.—Bridlington Town Council have purchased for about £5,000 about 35 acres in the Old Town, with, it is believed, the intention of developing the land in the vicinity of the stream known as the Gypsy Race, and making a pleasant walk along its banks. It is also hoped that a small park will be opened between what is known as West Gate and Well-lane, in the vicinity of the Rectory, and perhaps the desirability of setting up a garden village in the neighbourhood will also be considered.

Road Surveyors and the Army.—At their last meeting, Forfarshire County Council agreed to support the Forfar District Committee in seeking to secure the release from the Army of the road surveyor for the district, Mr. A. Lindsay. The chairman said he thought it was one of the most stupid decisions in connection with the public life of Forfarshire to refuse exemption to the road surveyor, when there was so much difficulty in getting roadmen, and when there was so much extra traffic passing over the roads.

Two Sludge Problems.

By ARTHUR J. MARTIN, M.INST.C.E., F.R.SAN.I.

It is the unexpected which always happens. A few short years ago the boldest prophet could hardly have ventured to predict that sludge, the *bête noire* of the sewage works manager, was destined to become an important factor in the purification of sewage. Truly the whirligig of time brings its revenges.

The new process, like every other method of purifying sewage, has brought with it problems of its own, not the least of which is that of utilising to the best advantage the air upon which the purification depends, and the compression of which is by far the largest item in the cost of the process.

In all the experiments hitherto reported, the amount of air found to be necessary to effect a satisfactory purification has been far in excess of that required to oxidise the organic matter in the sewage. Thus at Worcester, with a sewage absorbing in four hours 2·1 parts of oxygen per 100,000, or 4·3 cub. in. per gallon, 0·8 cub. ft. of air, containing 288 cub. in. of oxygen, were used for each gallon of sewage.* The stronger sewage of St. Albans, absorbing 16·2 parts of oxygen per 100,000 (33·2 cub. in. per gallon) required 2 cub. ft. of air, or 720 cub. in. of oxygen per gallon,† being 21·7 times the theoretical quantity, as against 67 times at Worcester. Other experiments carried on elsewhere have yielded comparable results. Mr. F. W. Mohlman, for instance, in his thesis for the University of Illinois, printed in the *University Bulletin* for 1916, gives the results of his experience as follows: "In the presence of 25 per cent of sludge, weak sewage was well nitrified in four hours with one cub. ft. of air per gallon of sewage. Normal sewage required four to five hours aëration and 1·3 cub. ft. of air per gallon of sewage. Strong sewage required more than five hours aëration and more than 1·5 cub. ft. of air per gallon of sewage,"‡ the corresponding volumes of air per imperial gallon being 1·2 cub. ft., 1·56 cub. ft., and more than 1·8 cub. ft. for weak, normal and strong sewage respectively.

The large excess of air which is found to be necessary is due in part to the twofold duty which is thrown upon it. Over and above its own proper task of supplying the oxygen required for purification, it is called upon to perform an important mechanical function. It is essential to the success of the process that the three agents concerned in it—the sewage, the activated sludge and the air itself—should be intimately intermixed, and this is done by means of compressed air. At Sheffield, it is true, mechanical stirring is resorted to for the purpose; but in the large majority of cases the difficult task of maintaining the three reacting substances in close association is thrown upon the air, necessitating the use of many times the quantity which would suffice for oxidation.

A further reason for employing a large excess of air is the extreme shortness of the time during which it is in contact with the sewage. A deep tank gives a longer contact than a shallow one; but, if the air is allowed to rise freely, the period can at best be a few seconds. This period might, however, be prolonged to any desired extent by turning the contents of the tank upside down before the air has time to escape, which can readily be done by the use of a horizontal cylindrical tank, the contents of which are maintained in a state of rapid rotation, combined with a slow longitudinal flow. Such a tank might consist, for example, of two tubes side by side, each 3 ft. in diameter, and 100 ft. in length, with a united content of 8,836 gallons. The sewage, with its charge of activated sludge and air, would pass along one tube and return by the other, being then discharged or again circulated through the tubes as might be found best. The rotary motion of the sewage might be set up and maintained by means of jets of compressed air or of sewage injected tangentially, preferably the latter, as the amount of air required for the purpose would be considerable. If jets of sewage are used to effect the rotation, the air required for oxidation may be introduced through perforated pipes or porous tiles, or by any other suitable means. If, however, the tube is not quite filled with sewage, the top few inches being occupied by air, the incoming jets and the subsequent rapid rotation of the liquid will doubtless entangle and drag down all the air which is necessary, thus obviating the need for compression and for the expensive machinery required for the purpose. Where the sewage is pumped, the delivery pipes might be so arranged as to set up the desired rotation, thus effecting the aëration of the sewage without any special machinery whatever.

It might in some cases be preferable to inject the compressed air at the lower end of the rising main, in which case special castings might be placed at intervals along the latter to quicken the rotary motion of the sewage.

The best rate of rotation can only be determined by actual trial. Within certain limits the higher the velocity the more intimate will be the admixture of the contents of the tube. Too rapid a rotation, however, would tend to separate them into concentric layers of sludge and sewage, surrounding a central core of air. This centrifugal effect would be counteracted to a certain extent by the tendency of the air to rise and that of the sludge to sink, and might be further combated if necessary by means of occasional jets of sewage impinging at such an angle as to set up eddy currents, which would break up the incipient layers without unduly checking the prevailing spiral motion.

THE DEWATERING PROBLEM.

The other problem is a much older one, and has baffled a whole generation of engineers. It is stated afresh by well-nigh every writer on the treatment of sewage. To quote one among the many recent references to it—Colonel Geo. G. Nasmith and Mr. G. P. Kay, of Toronto, begin their paper on the "Fertiliser Value of Sludge," in THE SURVEYOR of August 30th last, as follows: "The important problem remaining to be solved in the disposal of sewage is probably that of dewatering the sludge."

The methods which have been used for this purpose have been many and divers—air drying, drying by heat, fermentation with yeast, filter-pressing and draining on prepared beds. Yet another solution of the difficulty is suggested by some observations made by the present writer in connection with the septic tank laid down at Belleisle, Exeter, in 1896. In this tank the sludge was purposely left to accumulate for several years, and by December, 1900, it had reached a depth of about 4 ft. Samples were then taken from the top, the middle and the bottom of the deposit. These samples showed a water content of 88·8, 83·9 and 80 per cent respectively, the percentage of water diminishing progressively from the surface to the bottom. There can be little doubt that the comparative dryness of the lower portion of the sludge was due to the squeezing out of the water by the weight of the superincumbent mass, each particle of which exercised on those below a partial pressure due to the difference between its own weight and that of the liquid which it displaced.

The observation above recorded has been confirmed by experience at several other works. A large proportion of the suspended matter which many tank effluents contain is derived from the sludge banked near the outlets, portions of which are periodically lifted to the surface by the gas generated therein. With a view to obtaining a tank effluent as free as possible from suspended matter, the writer has been in the habit of laying at the outlet ends of the floors of his tanks a pipe, having a slot extending the whole width of the tank, through which the sludge under the outlets for effluent might be forced out by the pressure of the sewage. Where these slotted pipes were regularly used, they worked freely, and the floors near the outlets were kept comparatively clean; but where, as not infrequently happened, they were neglected, the sludge accumulated, and often became so dense that when the valves were opened to draw it off, it would not budge.

At Andover, for instance, there were three tanks side by side, the cleansing pipes from all three being led into a valve chamber by the side of one of the outermost. These pipes were left for some considerable time unused. When at last the valves were opened, the sludge from the nearest tank flowed freely, but that from the others, which had several yards of pipe to pass through, absolutely refused to move. At length, by dint of rodding, the pipes were freed, and the sludge began to come out very slowly in a dense cylindrical core. The percentage of moisture was unfortunately not noted, but it was undoubtedly very low. At Andover, as at Exeter, the sludge was old and well mineralised, the loss on ignition in the latter case ranging from 27 to 31 per cent of the dried solid. It would not as a rule be convenient to keep the sludge in the tanks so long, and a fresher sludge might not consolidate quite so readily, but any sludge which will settle at all must be heavier than water, and will therefore exert a partial pressure which, though small in a shallow layer, will in a deep column be very considerable.

These observations suggest that an appreciable proportion of the water contained in sludge may be best and most economically removed by running or pumping the sludge into a shaft of the necessary height, provided at the base with doors through which the compacted material may be forced out by the weight of the superincumbent mass. After a few days in such a shaft, the lower portion of any ordinary sludge

* "Proceedings," Sewage Works Managers, 1917, pp. 37 and 38.
† THE SURVEYOR, August 30, 1918, p. 131.
‡ *Loc. cit.*, p. 111.

should have parted with enough of its water to be readily handled with a spade. If for any reason it is desired to dry it still further, a platform for the purpose may be arranged at the base of the shaft.

The use of heat at this stage will probably not be economical, better results being obtained by blowing air through the sludge, whereby the process of air drying may be greatly accelerated.

While it is practically certain that the sludge obtained by any of the older processes can readily be reduced to a manageable condition by its own pressure, it is not so clear that this method will be applicable to activated sludge. Such a sludge is notoriously flocculent and contains a very large percentage of water. At the same time, as pointed out by Mr. J. E. Willcox, in his recent presidential address to the Association of Managers of Sewage Disposal Works, it "settles with extreme rapidity."* There is little doubt, therefore, that in a shaft of sufficient depth the partial pressure, even of an activated sludge, might be utilised to squeeze out a considerable part of its water contents. The pressure would, of course, be cumulative, each successive increase in the density of the material producing a corresponding increment in the pressure. Mr. Willcox himself goes on to suggest that "tank concentration might be found useful in order to reduce the quantity to be handled," and a shaft such as is now proposed is nothing but a very deep tank.

In consolidating an activated sludge it is important to avoid de-aëration, and to this end it might be necessary to blow in compressed air at the base of the shaft. The air on its upward way through the sludge will carry with it much of the water, especially if it is used hot from the compressor.

The writer puts forward these suggestions with some diffidence, but he is not without hope that they may point the way to the solution of two formidable problems.

ROAD MAINTENANCE IN CORNWALL.

THE WEAR AND TEAR OF STEEL-TYRED TRAFFIC.

The county surveyor of Cornwall, Mr. L. D. Thompson, submitted to the Main Roads Committee recently a report on the subject of motor traffic and the cost of road maintenance, differentiating between light and heavy traffic. As to light car traffic it was almost impossible to arrive at conclusive evidence as to the wear caused by tyres of rubber only, but it was clear that on water-bound macadam pitting and the sticking out of small stone and binding material was caused by the traffic as a whole. He was of opinion that steel-studded tyres did far more damage than those of rubber only, and he had always been surprised that they had been permitted. Some reduction in wear and tear due to the less amount of light car traffic was noticeable on about two-thirds of the main roads in the county. On one of the roads where the difference would be most marked it would be at the rate of £10 per mile per annum. At this rate on the 400 miles the saving would be £4,000, but he was convinced it was much less than this. As to the heavy traffic there were few petrol-driven lorries in the county, and consequently the petrol restrictions had made very little difference as regarded this class of traffic. The wear and tear of some roads due to steel-tyred motor lorry traffic was appreciably above the average rate per ton per mile. Any saving, therefore, in the cost of maintenance was entirely due to the reduction in light car traffic. During the financial year ending March, 1917, there was an unspent balance of £4,814, and in the following year of £6,282, but these sums did not represent actual savings but arrears of maintenance works.

The chairman (Sir A. Carkeek) said the report was most illuminating, prepared by a man of wonderful experience, whose judgment could be relied upon. It was worth an hour or two's attention by members in the quietness of their homes. It would enable them to form better judgment when matters came before them, because they often ran away with notions of their own which were contrary to those of experts.

Institute of Arbitrators.—The annual meeting of this body was held on the 15th inst. at Winchester House, Old Broad-street, E.C., when the retiring president, Mr. Henry Adams, M.INST.C.E., presented the report of the council and the financial statement, which showed a satisfactory condition. Mr. H. D. Searles Wood, F.R.I.B.A., was elected as the new president, and Mr. E. C. P. Monson, F.R.I.B.A., as vice-president.

Sewage Purification and Sewage Lifting.—Messrs. Tuke & Bell, the Carlton Engineering Works, High-road, Tottenham, London, N. 17, have issued a new booklet for architects, dealing with sewage purification and sewage lifting, along with drainage and other matters. The firm are preparing another booklet more suitable for municipal and civil engineers, which will complete a trio of booklets, the first of which, on water softening and water filtration, was issued some months ago.

* The Surveyor, August 9, 1918, p. 66.

HOUSING NOW AND AFTER THE WAR.

COUNTY COUNCILS' NEW POWERS.

The text has been issued of a Bill which was introduced in the House of Commons last Thursday and which is designed to give county councils further powers for the provision of housing for the working classes. The most important provision in the Bill, which applies only to England and Wales, is that which empowers the Local Government Board during the war and for twelve months afterwards to authorise a county council to provide houses for the working classes where a local authority within the county has not taken adequate steps under existing legislation to do so. Another section increases to eighty years the maximum period for the repayment of money borrowed by a county council to provide dwellings for persons employed by it.

THE PROBLEM IN IRELAND.

Asked in the House of Commons whether the Government had prepared a scheme for the provision of suitable houses for the workers in the towns and cities of Ireland; whether the Treasury had been requested to support such a scheme; and if he could say when the Government would begin to carry out in Ireland a scheme to settle the housing problem, the Chief Secretary said he was not in a position to make any statement on the subject. The matter had, however, engaged his attention to a very considerable extent.

Barnsley Town Council have asked Mr. J. P. Wilkinson, architect, to prepare schemes for three sets of houses.

Mexborough Urban District Council are negotiating for sufficient land for the provision of 200 working-class dwellings.

Peterhead Town Council propose to build fifty working-class houses, and are negotiating for the purchase of the necessary land.

Malton Rural District Council have appointed a committee to select sites and prepare plans for working-class houses.

The Western District Committee of Haddingtonshire contemplate the erection of 200 houses, and the Eastern District Committee sixty-five.

The city architect of Sheffield reports that a contract has been arranged with Associated Builders, Limited, for the erection of 261 houses at High Wincobank.

Eastbourne Rural District Council are promoting a scheme for the erection of seventy houses in various parishes, and also for the housing of their own employees.

Hendon Urban District Council have instructed the surveyor, Mr. S. S. Grimley, to make inquiries as to land available for the erection of houses at Child's Hill.

Wayland Rural District Council have decided to prepare a housing scheme. It was stated that there was a need in the council's area for cottages with three bedrooms.

Gellygaer Urban District Council have considered proposals for the erection of between 2,000 and 3,000 houses, and have appointed Mr. P. Jonas-Williams, of Shipley, architect to the schemes.

Birmingham Housing and Town Planning Committee recommend the council to apply to Parliament for the necessary powers to carry out the policy outlined in their report approved in July for the erection of 1,350 working-class houses.

The engineer and surveyor to the Eton Rural District Council, Mr. A. Gladwell, has submitted a report in which he estimates that 1,135 houses will be required in the rural area, and the council have appointed a committee to consider the subject.

A firm in the North-West of England is erecting a garden village of fully 4,000 houses for the accommodation of 15,000 people. At present 300 houses are in course of construction. There are unenclosed grass spaces for recreation along the front of each block. A church, school, playground, and refreshment house are included in the plans. The village has already its own farm for supplying milk.

East Grinstead Rural District Council have informed the county council that they will be prepared to formulate a scheme for erecting up to thirty-six cottages in or near positions indicated by the surveyor, and to consider the question of a portion of such cottages being placed at the disposal of the county council for the use of their employees on terms to be agreed. With regard to the question of the number of cottages which would be required for the general public, they are of opinion that the building of such cottages as might be found necessary should, if possible, be left to private enterprise.

Surveyors' Institution.—The opening address of the president of this body, Mr. John Hubert Oakley, the senior partner of the firm Messrs. Daniel Smith, Oakley and Gerrard, will be read at 5 p.m. on Monday, November 11th.

Regional Planning.*

By D. M. JENKINS, ASSOC.M.INST.C.E., Borough Engineer of Neath.

The limited experience already gained in this country has emphasised the need for regional planning as against piecemeal or merely site-planning, and shows that local schemes need to be supplemented and co-ordinated, not only in relation to one another, but to future regional development. It is common ground that broad and comprehensive treatment over large areas is absolutely necessary to serve the following amongst other purposes: The provision of new and improved arterial roads, loops, and by-pass and ring roads; the correlative lay-out of contiguous districts and location of industrial and residential areas in relation to the general amenity and to transport facilities; the more general development of building land on equal lines, so as to bring larger areas into the market at the same time, and so help to level conditions and values; the further development of garden cities and villages, laid out to meet industrial requirements and serving to arrest the congestion of great centres of population and assist in the much-needed purpose of reviving rural life.

LARGE-SCALE CONSIDERATIONS.

To put matters broadly, what is required as the condition precedent to town planning is "a large-scale consideration of the kind of development that best suits a whole group of areas, and that such consideration should extend not merely to housing, but also to new and improved road communications, transport facilities, and the provision of central power stations, in short, to all matters affecting the inter-relationship of one area to another, and even to large combinations of areas." The ideal aim would be that a regional survey of the needs, potentialities and resources of a whole county or group of counties, having regard to natural conditions, proximity or accessibility to coalfields, to the seaboard and other factors, should precede any detailed planning of an area. May one not anticipate as part of a sound scheme of reconstruction after the war, and in the interest of national economy, a systematic practical survey, with a view to the full utilisation of the national mineral and other resources, which will serve for future guidance in regional planning.

The need for housing schemes throughout the country is so pressing that obviously a considerable amount of town planning must be done before the broad lines of treatment indicated can be reduced to practice. The benefits of regional planning, however, should at once be secured, in as great measure as possible, by grouping areas for treatment which are closely related topographically, industrially and economically. It is of the highest importance, for example, that planning in the great industrial area of South Wales, comprised in three counties, should be grouped and co-ordinated under some form of centralised control. There are numerous other large areas throughout the country to which the same remark applies. The position in South Wales is such as to specially call for and admit of regional treatment on a comprehensive scale. "Our knowledge of the geology of the coalfield is now sufficiently thorough to enable mining experts to indicate the precise localities in which further sinkings should be made. This is understood to be particularly the case as to the whole tract of country along the southern outcrop of the coal measures. If this be so, the reservation of suitable land for housing, and the proper planning of it (including the direction of the roads) should be undertaken at least in conjunction with and not after the selection of the site for the industry.

Generally, it may be said that the necessity for regional planning is nowhere more insistent than in the valleys of South Wales, which are very steep and narrow, and presented a problem for special treatment as a whole, which will avoid the perpetuation of the chaotic and haphazard development of the past.

REGIONAL SUPPLY OF POWER.

The trend towards regional treatment and control has been strongly evidenced of late in the various schemes of reconstruction and industrial improvement, designed to promote to the utmost national efficiency and economy, which are now being put forward and under consideration. Among the most important are:—

(1) The generation and long distance transmission of electrical energy on a regional basis, as outlined in the report to the Ministry of Reconstruction of the Coal Conservation Sub-Committee.

(2) The utilisation of water power on a large scale, and the conservation of available water bearing areas under regional water boards.

(3) The production of gas (of high calorific value rather than illuminating power), by carbonisation at the pit's mouth, and its transmission in a compressed form to gas-works and factories throughout the country.

All these, which are vital factors in the future national prosperity, as providing cheap power to practically all parts, will have a far-reaching effect upon industrial development throughout the country. They will give a wider range as to choice of sites for works and dwellings and promote the development of village industries and the regeneration of rural life. In Wales, as in other areas, the utilisation of water power for the generation of electricity will result in the location of the super power stations not being wholly confined to the coal fields, and in the remote districts being ensured a cheap supply of power. The regional control of water supply will remove many of the difficulties which impede the development of existing and the establishment of new centres of population. Further, the abatement of the smoke nuisance, made practicable by the regional supply of cheap gas and electricity, will be a powerful factor in the development of new garden cities and villages, with their industrial, residential and agricultural zones. The benefit to agriculture and rural conditions resulting from a cheap supply of electricity also will be great, as providing means for the artificial production of nitrates and other nitrogen products which are necessary as fertilisers, and for stimulating the growth and yield of cereal crops (as shown by experiments conducted in Scotland and elsewhere). Generally, the regional supply of power must tend to promote in many ways regional or co-ordinated planning. The revival and development of inland waterways also is a project now being practically dealt with which will tend in the same direction.

ROADS.

The large increase after the war of road transport for short-distance traffic is confidently anticipated. Its development will be stimulated largely by the general supply of cheap forms of power; and this again emphasises the necessity for regional planning of and control of roads, and of providing and maintaining a system of well-designed and equipped arterial roads.

The need for and importance of regional planning in the broadest sense, with its corollary of effective machinery for co-ordination, are obviously beyond question. But, as already remarked, town planning cannot be delayed until a complete and far-reaching scheme to that end has been worked out, and the planning of areas will have to proceed for a time with such measure of co-operation and co-ordination as is afforded under the Town Planning Act and such amending legislation as is found practicable within the available limits of time. It may be remarked that in some cases and circumstances the existing machinery appears to be found adequate to work out properly co-ordinated schemes; and in view of the pressing nature of the housing problem throughout the country, preliminary town planning at any rate must be generally undertaken by local authorities, even at the risk of regional co-ordination and linking up having to be attained by amending schemes.

PRESENT POWERS AND PROGRESS.

The provisions of the Town Planning Act enabling a local authority, under certain conditions, to plan an adjoining area or areas, and also enabling joint bodies to be formed for the purposes of extending schemes, are well known. Clearly, however, nothing in the nature of regional planning as now conceived was contemplated in the framing of the Act.

The invasion by one local authority of the area of another, against its wishes, for purposes of town planning, although approved in certain schemes (as in the Ruislip-Norwood), bristles with difficulty and causes of friction, and generally does not seem likely to be widely adopted. Birmingham and Sheffield have surmounted the difficulty and avoided divided control by absorbing adjacent areas coming naturally within the extended scope of their town-planning schemes; and probably at no distant time there will be a "Greater Cardiff" and a "Greater Swansea" resulting from extension into surrounding areas which require to be carefully planned and regulated in relation to the existing towns. In the Clyde Valley the initial stages of town planning were marked by a number of competing schemes, in which two or more local authorities were seeking to town plan the same area. The way out in this case has now been found, chiefly through the efforts of the central authority, in the co-operation of the local authorities concerned in a joint town-planning scheme, by which the obstacles of mere technical boundaries to regional planning are sought to be removed. Quite recently the initial steps have been taken to promote a joint town-

* From paper presented at the annual meeting of the Institution of Municipal and County Engineers.

planning scheme by the Leicester Corporation and adjoining local authorities, which is intended to embrace, as explained by Mr. Mawbey, the laying out of a ring road, chiefly through undeveloped land, linking up the whole of the existing roads leading outwards from the borough. As a further step in the direction of regional planning, there has been set up a Standing Conference of representatives of the local authorities in the Eastern Valleys of Monmouthshire for the purpose of working out co-ordinated housing and town-planning schemes. In this connection it may he remarked that there is great and pressing need for joint or co-ordinated action for the development of a number of rural districts in Glamorganshire which are still in the early stages of their growth.

The present position of town planning in this country, however, clearly shows that further legislation is necessary before any great advance can be made.

SUGGESTED LEGISLATION.

The first step towards more general town planning, which is a prime essential of regional planning, is the simplification of the procedure to be followed in obtaining sanction for and in the preparation of schemes. What is particularly required is the reduction of the work to be done in the initial stage, on the lines laid down by Mr. Abbot in his presidential address to the Town-planning Institute in October, 1917. Certain amendments of the Town-planning Act are also suggested to more clearly define and to enlarge the scope of the powers, so as to enable, among other things, a town to be planned, which cannot be done under the present act. The Royal Commission on Housing in Scotland recommends that local authorities be clearly and definitely empowered to re-plan areas already wholly or partially built up, which are unsatisfactory on account of their age, or which are of an insanitary or unhealthy kind; and the further suggestion has been made with much reason that local authorities should have wide discretion in fixing areas to be town-planned, and be empowered to carry out town improvement schemes under the Town-planning Act. It is at any rate most important that undeveloped land should be laid out and planned in relation to future improvements in the built-up areas.

OBLIGATORY PLANNING.

The next legislative step now being strongly urged is the setting up of obligatory planning. It appears to be clear that while the powers of the Town-planning Act remain permissive, there will be no general concurrent progress with town planning, which is necessary for broad regional treatment; and that to secure the needful co-operation and co-ordination, planning must be made obligatory upon all local authorities. In this connection it may be recalled that the Scotch Commission urges that the Local Government Board encourage the preparation of schemes of a general nature, and that orders thereafter be issued by the local authority, with the approval of the Local Government Board, which should deal with and prescribe in detail for each area as and when it became ripe for development. It is suggested that the obligation of local authorities should extend to the preparation of general or outline schemes on these lines, dealing with building densities; building lines on new and existing roads; reservation of sites for open spaces; the lay-out of arterial roads, &c. Such schemes prepared in broad outline would provide the necessary elasticity for dealing with unforeseen developments and fit in later with the requirements of regional plans. The issue by the Local Government Board of model clauses for the guidance of local authorities preparing schemes would be of great service, and furnish a much-needed element of co-ordination. Such clauses should, it is suggested, include general provisions as to building densities, variations of widths of roads, &c. Sec. 55 (1) of the Town-planning Act, authorising the Local Government Board to prescribe a set of general provisions or separate sets of general provisions adapted for areas for any special character for carrying out the general objects of town-planning schemes, has not yet been acted upon.

CO-OPERATION AND CO-ORDINATION.

In the policy adopted by the National Housing and Town Planning Council, which generally includes proposals to the foregoing effect, co-operation and co-ordination of the work of local authorities are to be brought about through district conferences, composed of representatives of local authorities and county councils. Such conferences are to be set up, under powers to be conferred by special enactment, by the Local Government Board for England and Wales and for Scotland for the purpose of securing the fullest measure of co-operation between local authorities in the preparation of town-planning schemes, more particularly in regard to main and secondary roads. This provision is evidently modelled upon the conferences set up for London by the Local Government Board, with a view to co-ordinating the town-planning schemes undertaken by the Metropolitan councils independently of one another, and providing for the treatment of London as a whole. As part of the same policy, the Housing and Town-planning Departments of the Local Government Board would be made first-class administrative departments, and be fully equipped to guide and stimulate the work of local authorities; and advisory boards would be formed from time to time to consider and submit suggestions to the Government in regard to new legislation and administration by these departments.

The setting up of obligatory planning and of district conferences to cover the whole of the country would no doubt go a long way towards securing the co-operation and in some measure co-ordination needed for regional planning; but what remains to be worked out in detail is the machinery for initiating and developing schemes in the areas of defaulting authorities and for the broad linking up and co-ordination of group or regional schemes formulated by the district conferences, subject to control and revision by the central authority. The unit adopted for the district conferences would probably be, in the first place, the county; but there must, to secure unity of development, be grouping of counties or parts of counties under central committees or bodies. The chairman of the Welsh Housing and Development Association (Mr. D. Lleufer Thomas) in an article on "The Regional Planning of Wales" in "The Welsh Housing and Development Year Book," 1918 (from which the foregoing quotations in this paper are taken), outlines the constitution and functions of a proposed central committee for South Wales, whose duties would include the revision and co-ordination, subject to the approval of the Local Government Board, of the various schemes and proposals submitted to it by county committees or conferences. The committee would be assisted in its work by officials of the local authorities and by a few recognised experts, some co-opted and some nominated by the Local Government Board and other departments or bodies. Such committee, it may be suggested, should comprise or be advised by industrial experts versed in the regional conditions. Mr. Rees Jeffreys has suggested, on the other hand, the creation of a Statutory Town Planning Commission, empowered, among other things, to initiate schemes affecting more than a single area, its power to be exercised particularly in connection with arterial road projects affecting several districts, and also to include the initiation and development of schemes in the areas of defaulting authorities.

ARTERIAL ROADS.

With reference to the question of arterial roads as an all-important factor in regional planning, whatever new machinery is created a broad basis of co-ordination on a large scale is required in their planning and construction with a central authority, such as the Road or Traffic Department of a reorganised and reconstituted Local Government Board in control. The classification of roads, already initiated before the war, in relation to existing traffic roads, should, it is suggested, be extended to all projected arterial roads, and the contributions of the Government and county councils to and apportionment among local authorities of cost of construction and maintenance of such roads fixed upon properly defined bases. Some provision of this kind seems to be absolutely necessary to ensure the carrying out of great projects for new arterial routes, by-pass roads, &c.

It has been suggested, in connection with the district conference scheme, that the planning of new and improved main and secondary roads should devolve upon county councils. It would undoubtedly be of the greatest service that such councils should prepare surveys and route maps of proposed arterial roads for the guidance of the local authorities preparing town-planning schemes; but it is objected that it would be a retrograde step in the interests of town planning and of wide and spacious roads to take the detailed planning and exact lay-out of such roads out of the hands of local authorities. The positions and levels of new arterial roads must vitally affect and determine the mode of planning and development of areas, for which the local authorities are responsible, and these authorities have the strongest and most direct interest in the provision of adequate traffic facilities. Subject, however, to the final decision of the central authority, arterial road plans must come within the general purview of county councils as the county road authorities, and in all projects included in town-planning schemes they obviously should have full and effective right of criticism and of opposition.

City Council and Conscientious Objectors.—Westminster City Council have made a standing order that no person who has evaded military service by claiming to be a conscientious objector shall be employed by the council.

Manchuria Roads.—According to an American Consular report, few roads suitable for motor vehicles have been built in Manchuria. The cost of road building is borne entirely by the general government. Considerable sums have been spent on the streets of Dairen, and they are now in good condition. They are built with bluestone covered with hot tar and gravel and thoroughly rolled, and are very similar to asphaltic pavements.

ROAD CONTROL AND THE PETROL TAX.

By Frank Nicholson,
Acting District Surveyor, Chard Rural District Council.

Now that the control of roads is on the "surface," and petrol is "under thumb," would not the present be an opportune time for opening a discussion and having interested views on the question of a more just and equitable distribution of the petrol tax? In voicing what seems to be a workable scheme for the latter, I would endeavour to show how the pre-war method of distributing the petrol fund affected the former—road control—from a road-user's point of view and recent criticisms in general.

Up to the present the petrol fund (Road Board grants) has been doled out upon anything but a fair basis. Briefly, county councils have taken the "cream," and those county authorities lending themselves to the most progressive road policy have been on top. There has been no justifiable reason that this should have been so, since the petrol from which the fund is raised is used on all roads in a fairly general degree.

Take, for instance, a purely agricultural county where the motoring interest is probably of the touring kind. The spending of large sums from county funds for purely road improvement work, as has been understood before a grant would be allocated, purposely to obtain a grant, has been looked upon as something entirely in the motoring interests and condemned locally. On the other hand, in a county where the motoring interest is local, a progressive road policy is welcomed, and on the long-sighted policy of spending an accumulated amount upon sole improvement in one year rather than spending it as an ordinary year-after-year increased maintenance expenditure, a good, useful grant is obtained.

Again, take an agricultural county where road improvement works under Road Board grants have been carried out. By improvement I mean surfacing of first-class material, with or without some form of surface tarring. In such a county, horses, being used chiefly on the land, are shod most suitably flat for such work, and their advent on the so improved stretches brings grief and condemnation on such improved spots. In industrial counties horses are shod rough for the road generally, and the result is one hears little but praise when such an improvement is reached. The motorist comes along, praises this stretch and similarly praises State control, but finds nothing good in

LOCAL CONTROL.

He proceeds farther to the inevitable bad stretch and outwardly condemns local control; but such complaining motorists would do well to remember and ponder over the percentage points hereinafter brought forward before condemning what has been termed the "hundred-and-one" different "patch-as-patch-can" methods of present-day road maintenance.

Again, what small percentage of Road Board grants (petrol fund) already allocated have reached district roads? Nil. And, as opposed to that, what small percentage of district roads are totally free from the source of such grants—viz., petrol-driven motors?

The percentages asked are contrariwise and give an extreme adverse ratio as between the miles of district roads that are petrol used but receive no assistance and the small main road mileage already assisted in comparison with the total mileage of all existing roads.

In this district within the last year or so, owing to scarcity and cost of horse labour, heavy, solid-tyred motor lorries are being used for collecting milk from outlying farms approached solely by district roads, some of which roads could be classified in the lowest road category. The result is, for one mile of main road travelled by these lorries that could expect assistance by way of grant under the present system of allocating the petrol fund, ten miles of district roads are travelled that could not expect one penny assistance. In passing, I would here say that these heavy, solid-tyred lorries are proving an abomination on roads to-day. What was the trouble on narrow roads owing to enforced single-track driving is now appearing on wider roads much used by these lorries, and where other traffic under present-day conditions is not frequent enough to compel them to spread out.

Again—and I speak of a northern Scottish county, with almost as unequal a chance of obtaining its fair share of the petrol funds as at present distributed as any district road, and where the impeding feature is not local motor prejudice—this point is quite the contrary, as it has long since been acknowledged that any betterment in roads there and a consequent increase in motoring would be an increased benefit to that county—probably to a much greater extent than in more southern counties.

The impediment is threefold. First, lack of local funds; second, no need for road improvement proper (by "road improvement" I refer to it in that sense that improvement is understood by the Road Board before the question of a grant will be considered—viz., first-class surfacing materials with some form or other of tar-dressing); third, the small percentage of cars registered in the county—probably some thirty all told.

During the season the "foreign" car influx is abnormal, and I have known in one garage alone twelve cars each of a value well over £1,000, which used the county roads for something like four months. I specially mention £1,000 cars, as these are the real road users in the severest form of that term. Probably, again, local control is here condemned for the poor motoring conditions existing.

Withal, the few instances cited serve to show the unfairness of

UNCONSIDERED CRITICISM,

and it cannot under any pretext be put forward that the present system of control or management has broken down. It should, however, be remembered that road mileage cannot be cut down to suit to-day's available labour as has been done with the output in industrial concerns. Further, it can safely be acknowledged that the "brains" under the existing system of local control are quite equal to whatever demands may be made on roads, and successfully from tried experiments, provided sufficient funds were available—herein lies the trouble.

The discussion required is: Could not the old toll-gate method be readopted, but in a much modified form, on the bonded store principle to assure each county getting its just amount of petrol revenue derived solely from petrol consumed in that county? The system would be: Each county to have its bonded petrol store supplied directly from the nearest Customs port. Each county's consumption would be thereby readily known and easily got without any new State "machinery." No car to travel from one county to another with more petrol than would reach the nearest garage in the next county, which garage would draw its own supply from its own county bonded store. The difficulties of "watch" might be made against this, and reasonably; but if the "watch" was proved impossible or costly it could be set off with no "watch" at all, as cars do not as a rule carry such tremendous quantities of petrol.

With some such system each county would know exactly what grant it was entitled to and would get. Further, all roads in each county could be classified and given values according to estimated motor traffic on such a class. Such estimated traffic could be amended from time to time as conditions of motor use on any class of road changed. The county authority would then distribute the total county petrol fund amongst its own roads and district authorities.

This sounds like neutralising the existing Road Board; but there is abundant use and opportunity for such a central State authority to act upon scientific lines and in an advisory manner in conjunction with local control. Exclusive

STATE CONTROL,

while probably more beneficial from a road surveyor point of view, would more likely than not come a cropper. Road maintenance will never lend itself to standardised ideas or stereotyped methods until the funds are large enough to make standardisation possible. At present the available funds are not by any means large enough, and there is no near likely possibility of them being so. Who, therefore, is more suited to eke out existing funds to their biggest local value than local control? It will, however, be a step forward in local administration generally when power is obtained to compel where possible the appointment of at least one qualified engineer to be a member of all local authorities.

Such a system would not increase the available fund, but merely equitably distribute the existing one.

This still leaves the dire necessity of some substantial State assistance, and here, as at present, the Road Board would act as distributor of this special fund to any local authority of a progressive town who came forward with improvement schemes over and above their ordinary maintenance expenditure.

In touching upon these items big issues are raised, and one other point would be: Why not alter the whole present-day unequal system of road rating?

In conclusion, it might not be out of place here to mention the unique opportunity—provided the roads are not let down beyond reasonable recovery—that is at present offered, owing to restricted traffic and consequent decreased ordinary maintenance expenditure for changed methods of road upkeep. Under pre-war normal traffic conditions any change, while fully acknowledged, was not reasonably possible. In future such unspent funds could be well spent in putting in foundations, continuous kerbs for haunch strengthening and drainage on those roads which have for years proved very costly under purely surface repairs.

This is a problem for the "small fry" of the road profession to take up. County surveyors have little to complain of as at present, but much to lose in any amended and equal distribution of the petrol fund; and while their support could not be expected their views would be welcomed.

THE CITY OF BIRMINGHAM ARTERIAL ROADS IMPROVEMENT.*

By Henry E. Stilgoe, M.Inst.C.E.,
City Engineer, Birmingham.

The question of dealing with the improvement of the main roads of a large city depends, of course, primarily upon a consideration of the present and the future traffic that the roads will be called upon to carry.

The traffic of Birmingham, like that of most large industrial and commercial centres, has in recent years undergone considerable change in character and in volume. This has been due to the advent and development of petrol-driven vehicles and the increased use of steam vehicles. The development of the tramway system has also directed attention to the necessity of improving the main roads, and this necessity has been emphasised by the preparation of town-planning schemes in which arterial streets have been planned 100 ft. or more in width, to connect directly or indirectly with the main roads of the city which are of lesser width.

LOCAL STREET IMPROVEMENTS.

As in all growing towns, local street improvements have been carried out in Birmingham from time to time where there was obvious necessity. In fact, during the last eleven years no less a sum than £492,375, or an average yearly outlay of £44,761, has been spent upon street widenings. These widenings were of the nature of average widenings carried out in various towns throughout the country—that is to say, they were, generally speaking, in connection with some immediate purpose such as widenings for tramways or the removal of projecting buildings; and although the corporation have paid heavy sums for disturbance and frontal values which would not have been appreciably increased by the acquisition of more land, the widenings can in no sense be regarded as adequate. In consequence of the conditions of modern traffic which have developed so rapidly, it has been found necessary to take a much wider view of the subject and to consider the future needs of the city as a whole.

RING ROADS.

In taking such a general view it became apparent that not only was it necessary to improve the existing main radial roads and to plan new ones, but it was also desirable to plan what for convenience may be termed ring roads, which will intersect the radial roads and so by-pass through traffic (which would otherwise pass through the centre of the city) and also provide inter-communication for local traffic between the various developing districts of the city.

In Birmingham careful consideration has been given to the main road problem. The preparation of an effective scheme has been made possible by the great extension of the city, when in November, 1911, the area was increased from 13,477 acres to 43,601 acres by the inclusion of the adjoining districts of Handsworth, Aston, Erdington, Yardley and King's Norton and Northfield, places which were already, in effect, suburbs of the city and enjoyed many of the public services, such as the supply of water, gas, &c., and sewage disposal; but previously to the extension the city had in those districts no general powers of local government in respect of the planning of streets and building development. In preparing evidence for this extension the author had in view the linking up by circular roads of all the main radial roads passing through these suburbs to the centre of the city, and during the course of the proceedings at the Local Government Board Inquiry and before the Parliamentary Committees he produced a plan showing an outer ring road, 100 ft. in width and of a length of about 24 miles, 13 miles of which consisted of widenings of existing roads of 11 miles of new roads.

BIRMINGHAM'S SCHEMES.

The Birmingham Corporation have prepared, or are preparing, town-planning schemes under the Housing, Town Planning, &c., Act of 1909. These schemes are:—

(1)	Quinton, Harborne and Edgbaston scheme	2,320 acres
(2)	East Birmingham scheme	1,443 ,,
(3)	North Yardley and Stetchford scheme ...	3,176 ,,
(4)	South Birmingham scheme	8,267 ,,
(5)	South-West Birmingham scheme	9,866 ,,

The first two have received the approval of the Local Government Board and have the force of Acts of Parliament; the last three are in various stages of progress. Within the areas of these town-planning schemes there are several miles of existing arterial roads, and in their preparation provision has been made for widening these arterial roads and for planning new ones. Due Parliamentary authority is thus obtained in such areas, but for the roads in the built-up portions of the city where schemes are outside the scope of the Housing, Town Planning, &c., Act of 1909, other Parliamentary powers are required. As the proposed improvements within the built-up areas consist almost entirely of street widenings, the city council have determined to proceed by prescribing frontage lines under the powers conferred upon them by the Birmingham Corporation Act of 1903. . . .

This is an extremely valuable and convenient power, as the corporation can put it into operation at will in respect of any street or part of a street. The land is earmarked for the widenings to be done as and when the corporation so desire, and in the meantime the corporation cannot be compelled to purchase any buildings that stand upon it. It does not involve carrying out of constructive work within a given period, as would be the case with an ordinary Improvement Act.

The project involves the widening of existing streets (or the construction of new streets) many miles in length, and it is proposed to carry out the work from time to time as rebuilding takes place or other reasonable opportunities occur. It is, in fact, a progressive scheme in a constructive sense, and it is a preventive measure, inasmuch as by prescribing frontage lines new buildings will have to conform to the new lines laid down. Private Bill legislation could not so conveniently be adopted in connection with it, and it will be appreciated that a reliable Parliamentary Estimate to accompany a bill could not be prepared, or, if prepared, would be useless, as such would have to include the cost of buildings, trade interests, disturbance, &c., which would probably never have to be purchased if the work is carried out by the method of prescribing frontage lines as in Birmingham.

An additional advantage of prescribing frontage lines over the carrying out of a general improvement scheme is that rateable values on the roads in question are not disturbed except to an inappreciable extent in consequence of the gradual manner in which the corporation's object is attained.

PRACTICAL DIFFICULTIES.

Naturally certain practical difficulties will arise in carrying such a far-reaching proposal into effect, but it is anticipated that these will be few, and it is only necessary to draw attention to one—namely, the deep set-backs in the building line which would be unsightly as well as detrimental to business premises. This can be met, as is done at present, by the erection of extended fronts at a less height than that of the main building, such fronts to be removed when the corporation are in a position to carry out the widening and improvement of a certain length of road. Obviously the roads could not be widened to correspond with each set-back as it occurs. On practically all the main roads of the city the conversion of dwelling houses into business premises has been carried out by the erection of extended fronts, so that there is nothing new in this proposal. It is, in fact, the system by which road improvements are effected in London, where the set-backs referred to may be seen in such thoroughfares as the Strand and Fleet-street.

The modern construction of shop fronts facilitates arcading, so that where the set-backs occurred on streets in shopping centres this need not work to the disadvantage of the shopkeeper, but rather increase his opportunities of display.

In the preparation of so extensive a scheme it is necessary to think out clearly beforehand how it is to be accomplished and in what manner the case is to be presented, so as to ensure adequate consideration and approval by the local authority. A procedure which does not involve immediate and wholesale destruction of property and which can be applied gradually is at once attractive and sound in principle. The main arterial roads of the city radiate from the centre. Generally speaking, they may be taken as being about 50 ft. in width (some a little more) and nearly all have tramways laid in them.

TRAFFIC.

Every one of the city's arteries bears a very varied and heavy traffic, and towards the centre is generally more or less congested, the unloading and loading of goods is hindered, and the transit of heavy goods in particular is delayed.

No one will question the fact that each year brings about an increase in mechanically propelled vehicles, both for the transport of goods and passengers. There is a growing tendency for industrial concerns to use motor traction in preference to railways for the purpose of dealing with the delivery of materials and goods. This in itself has placed a very heavy burden of traffic upon the roads, apart from the great increase in recent years in fast motor traffic. Having in mind, therefore, that Birmingham is a large manufacturing centre, and that settlement in the city of all classes of industrial concerns must be encouraged, it is obvious that the future development of the city will be largely governed by the ability of its main roads to deal with the traffic needs of its industries. It may therefore safely be assumed that as the needs of manufacturers and the travelling public are met by the provision of suitable vehicles and suitable roads, the use of such vehicles will grow and multiply many times. The experience of the last few years does indeed point emphatically to the fact that motor traffic is not likely to decrease.

(To be concluded.)

* From paper presented at the annual meeting of the Institution of Municipal and County Engineers.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Brighton T.C.—It has been arranged to appropriate for the purposes of a second national kitchen a portion of a building in the London-road, used hitherto for police purposes. Alterations will involve an expenditure of £1,300, bringing the total spent upon these institutions to over £2,000.

Cambs C.C.—It has been resolved to rebuild Lord's Bridge, with a wider roadway and more waterway, at an estimated cost of £975.

Sidmouth U.D.C.—The county medical officer attended and stated that it was the intention of the county council after the war to establish an isolation hospital for East Devon, which would provide for thirty-six cases of infectious disease. Meanwhile the urban council are giving consideration to a proposal for making temporary additions to the hospital at Woolbrook.

REFUSE COLLECTION AND DISPOSAL.

Cromer U.D.C.—The chairman, commenting upon circulars received urging the saving of old tins, said that, although they were told in these appeals that old tins were valuable, all the council could get offered for the large quantity they had collected was 12s. a ton, which was less than what it would cost the council to cart them to the station.

Skelton and Brotton U.D.C.—The acting surveyor (Mr. A. R. Cranmer) reported that he had sent two of the scavenging carts to the makers and asked them for an estimate of the cost for repairs. The reply was that the cost would be £22 10s. each, and the carts would be repaired and made equal to new. They regretted that the price was so high, but the repairs could not be done for less. Replying to questions, the surveyor said that the price of a new cart now would be £38. The council agreed to have the repairs effected.

ROADS AND MATERIALS.

Argyllshire C.C.—The county council have sanctioned the proposal of the Mid-Argyle District Committee to carry out improvements to the Ardrishaig-Oban-road, at an estimated cost of £937, towards which the Road Board will contribute £288.

Cardiganshire C.C.—The county surveyor, Mr. T. E. Owen, has been authorised to make application for a number of German prisoners for the purpose of road work. With respect to a suggested grant from the Government for road maintenance, the clerk stated that Mr. Brookes, of the Road Board, had called upon him, and appeared to be anxious to make him understand that the Government was not prepared to make any grant. The Government attached importance to the haulage of timber, and would only give money to restore roads used in timber haulage. It was decided to appoint a committee to go into the matter.

Guisborough U.D.C.—It was reported that the surveyor, Mr. R. H. Kilburn, who was released from the Army, Grade III., Class W., in April last, had received notice of recall to the colours. Having regard to the state of the surveyor's health, and the great need for his services in connection with the supervision of the sanitation of the town and the upkeep of the roads, which have been much damaged through the great traffic on them in connection with the war arrangements in the district, the council unanimously resolved that the whole matter be laid before the Ministry of National Service and the Local Government Board, and that a strong application be made for the retention of Mr. Kilburn's services as surveyor and sanitary inspector.

Heston and Isleworth U.D.C.—The Road Board have authorised the council to proceed with the repairs to Barrack-road, at an estimated cost of £411, a moiety of which will be borne by the board. The Road Board are also recommending the War Department to agree to resurfacing Barrack-road and George the Fourth-road with tarred clinker, at an estimated cost of £1,190, the council to pay one third.

Shoebury U.D.C.—It was stated that the tar at the gasworks had been commandeered by the Government, the price paid being only 4s. 2d. per barrel, although it could be sold locally for 8s. It was decided to write to the Government Department concerned on the matter.

Southport T.C.—The policy of the Highways Committee in taking up setts from certain roads and relaying them in others was the subject of criticism. It is alleged that the real reason for asphalting Preston-road, although it was in good order, was that the cubes there were required for other streets. To this statement it was replied that Preston-road wanted repaving partly, but the real reason for pulling up the setts and asphalting the road was that the setts were wanted for Manchester-road, which is a main road, and has consequently heavy traffic, whereas Preston-road is a purely residential road, which would be better off with noiseless and less expensive paving. The particular setts taken up from Preston-road were not used anywhere except in Manchester-road. In course of time, it was added, the setts in light residential roads will be transferred to the main traffic roads. The cost of asphalting Preston-road was stated to be 4s. 6d. per square yard, and the cost of carting about 6d.

Westhampnett R.D.C.—The council have accepted the tender of Mr. George Ewen to supply a steam roller with scarifier and water sprayer, with driver, oil and coal, at £2 per day, and a charge of one penny per square yard for scarifying.

Woolwich B.C.—The Establishment Committee reported: "We have had under consideration a memorandum from the Works Committee, enclosing a letter from the Road Board stating that the board wish to express their appreciation of the services rendered by the borough engineer and his assistants in connection with the works of road improvement for military purposes carried out by the borough council, and, with the approval of the council, they desire to recognise these services by the payment of an honorarium of 300 guineas, of which it is proposed that 150 guineas should be paid to Mr. Sutcliffe and the balance to be distributed by him between the various officers concerned. The Works Committee express their great pleasure in receiving such a communication from the Road Board, and unanimously resolved to recommend us that a reply be sent to the Road Board stating that the council are willing to allow the borough engineer and his staff to accept the honorarium offered." The council decided to permit the officials concerned to accept the honorarium.

SEWERAGE AND SEWAGE DISPOSAL.

Aylesbury U.D.C.—Comment was made upon the excellent condition of the root crops at the sewage farm, and the surveyor, Mr. W. H. Taylor, was complimented upon his work.

Bradford T.C.—The potato crop on the sewage farm land at Esholt is reported to be an unusually good one, and it is also stated that an acre of ground planted with carrots as an experiment has yielded excellent results.

WATER, GAS, AND ELECTRICITY.

Barnsley T.C.—The town council are seeking authority to spend £12,500 for the extension of the electricity works.

Bolton T.C.—It is proposed to extend the electricity mains between the Back-o'-th'-Bank generating station and the Duncan-street sub-station, at an estimated cost of £1,500, and the Local Government Board are being asked to sanction the expenditure.

Briton Ferry U.D.C.—The council have called a conference of neighbouring local authorities to consider the question of amalgamating their respective gas undertakings.

Dronfield U.D.C.—It was reported that a profit of £868 had accrued from the water undertaking last year.

Mexborough U.D.C.—The Local Government Board have sanctioned an expenditure of £1,200 for driving a borehole to the Oaks Rock, with the view of supplementing the water supply.

Newcastle-upon-Tyne T.C.—The Parliamentary Committee have prepared a report on the electric supply proposals of the Government Committees. The report is against the conclusions of the committees, on the ground that private monopolies will be maintained, and public services may pass into private hands. A statement giving reasoned objections, prepared by the town clerk, will be submitted to other authorities on the North-East Coast area, with a view to joint representations being made.

MISCELLANEOUS.

Barrow T.C.—In view of the failure of the tramway system, the town council have asked the Parliamentary Committee to take into immediate consideration the question of promoting a Bill in Parliament to run motor 'buses in the borough and district.

Phillack U.D.C.—In reply to the representations of the council respecting the provision of a cemetery, the Local Government Board states that the restrictions on borrowing applied whether a loan was obtained privately or otherwise. The council have resolved that the provisional agreement to acquire a site be prepared and signed, so that the scheme might be proceeded with as soon as possible after the war.

PERSONAL.

Mr. H. Asher, surveyor to the Atcham (Salop) Rural District Council, has received a war bonus of £20.

Mr. E. T. Elliott, surveyor to the Wrotham Urban District Council, has received an additional war bonus of £40 a year.

Mr. J. Mathison, surveyor to the Langport Rural District Council, who was wounded while on active service, has resigned after twelve years' service with the council.

Mr. Hayes Fisher, M.P., President of the Local Government Board, has appointed Mr. Charles Knight an assistant secretary of the board, in succession to the late Sir Walter Jerred, K.C.B.

Mr. J. J. Barnes, of Gronville, Jersey, has been appointed temporary assistant to the county surveyor of Somerset at a salary of £250 a year, and an allowance of 3d. per mile for the use of his motor cycle.

Mr. W. Louis Carr, surveyor to the Ruislip-Northwood, Middlesex, Urban District Council, has been instrumental in raising a sum of over £200 in aid of the funds of St. Dunstan's Hostel for Blinded Soldiers and Sailors, a flag day, a concert and an auction being among the means employed to obtain the money.

Major A. L. Parker, head of the Road Materials Section under the Road Stone Control Committee, War Office, has been appointed to the Headquarters Staff, Western Command, as Roads and Communications officer. Major Parker is a member of the Institution of Municipal and County Engineers, and in civil life engineer and surveyor, Rutland.

Mr. W. B. Madin, surveyor to the Rushden Urban District Council, has received the congratulations of the council upon attaining his "majority" in the council's service. Mr. Madin was described as a man who was very thorough in all that he did, the success of the many improvements carried out in the town having been largely due to his straightforward and honest work.

Mr. P. Dodd, borough engineer of Wandsworth, has had his salary increased from £1,000 to £1,250 a year. When the proposition came before the borough council Councillor Golds took exception to this being a permanent increase, but had no objection to its grant for the duration of the war, and he moved an amendment that the £250 extra be given whilst Mr. Dodd performed the duties of coal overseer. Alderman Lorden and Councillor Mathias, however, were very emphatic as to Mr. Dodd's legitimate right to the £250 as a permanent increase in view of the splendid and unstinted services he is rendering to the borough, and the amendment was defeated by a large majority.

Mr. J. H. James, carpenter, Llandre, a discharged soldier, has been appointed surveyor to the Aberystwyth Rural District Council. Before the appointment was voted upon a letter was read from Mr. E. T. Felix, chairman of the Discharged Soldiers and Sailors Branch, asking that appointments should be given to discharged men, and Mr. J. D. Evans, secretary of the Pensions Committee, also asked for preferential treatment of discharged men, if competent. The committee viewed with grave concern any departure from the practice, and considered it their duty to investigate any apparent neglect. Mr. R. L. Evans said the latter part of the resolution was a covert threat. Mr. John Richards, Tynpynfarch, said discharged soldier candidates would stand a better chance if there was less dictation.

OBITUARY.

Mr. T. McKea, road surveyor and cleansing and works inspector of Falkirk, died recently, we regret to state.

The death took place at his residence at Twickenham on Monday last, at the age of 89, of Mr. Thomas Codrington, M.INST.C.E., F.G.S., a prominent figure in the road-making world of some thirty years ago, and the author of the well-known work "The Maintenance of Macadamised Roads." Mr. Codrington commenced his career as a pupil of Mr. T. K. Brunel, and after many years' experience in the work of a civil engineer was appointed general superintendent of the county roads of South Wales, having the supervision of the maintenance, the preparation of estimates and the auditing of the expenditure of about 1,000 miles of county roads in charge of some nine or ten surveyors. It was this experience that led to the publication of the book above referred to. Later he had the management of about 450 miles of main roads in Herefordshire, and was also engaged on other work, principally in connection with roads and bridges. He was appointed commissioner under the provisions of the Scottish Roads and Bridges Act, and Norham bridge over the Tweed was built from his design. On the abolition of his office in connection with the South Wales county roads in 1882, he was appointed an engineering inspector of the Local Government Board, and was associated with many of the arbitrations which took place between county councils and local authorities to determine the payment to be made on account of main roads. When refuse destructors were introduced, Mr. Codrington was selected to make an investigation into the subject of the destruction of town refuse, and the results were embodied in a special report issued by the Local Government Board. He was an honorary member of the Institution of Municipal and County Engineers, and was one of the readers of papers at the annual meeting of that body in 1894, the subject of his contribution, which attracted considerable attention at the time, being "Model Wheels and Road Coatings." The funeral will take place this (Friday) afternoon at Richmond Cemetery at 2.30 p.m.

INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS.

METROPOLITAN DISTRICT.

A meeting of the Metropolitan District of the Institution of Municipal and County Engineers has been fixed to take place at the Offices of the Institution, 92 Victoria-street, Westminster, at 5 o'clock on Friday, November 8th, to consider the following points brought forward by Mr. A. H. Campbell in his paper prepared for the last annual meeting:

(1) That this war-time is our work-time for the preparation of town-planning schemes as the essential preliminary to housing.

(2) That the Local Government Boards should recognise the responsibility of those who thus labour in the cause of public health, and entitle them to recognition by the State in manner and form advised by the Royal Commission on Housing (Scotland).

(3) That preliminary procedure to town planning should be greatly simplified and shortened, and thereon the Local Government Boards of England and of Scotland should be memorialised; towards this end it is suggested that advisory boards of practical technicians in town planning might be constituted upon the invitation of the central authorities to co-operate with their officers in this work, and in the drafting of a set of "General Provisions" as model clauses for town planning.

(4) That amending legislation be introduced to bring all undeveloped building sites in urban areas within the scope or operation of town planning, without the necessity of establishing in relation to them a *prima-facie* case.

(5) To deal with old or over-built or badly planned areas in cities, as town-planning areas, and to apply the provisions of the Town Planning Act to their clearance or to reconstruction on approved town-planning lines.

(6) To facilitate the acquisition for public purposes (particularly housing and town planning) of lands and heritages in manner as advised by the Royal Commission on Housing for Scotland.

SOUTH WALES DISTRICT.

A South Wales District meeting of the Institution of Municipal and County Engineers will be held at Cardiff on Thursday, November 7th, the following being the programme:—

3.30 p.m.—Meet at city engineer's office, City Hall, Cardiff. Business.—(1) Minutes of last meeting; (2) to witness a demonstration of Calway's concrete wall construction; (3) other important matters. Members are asked to make a special effort to attend.

FOR OTHER ADVERTISEMENTS
See End of Paper.

ALDERSHOT URBAN DISTRICT COUNCIL.
APPOINTMENT OF DEPUTY SURVEYOR.

The above Council invite application for the position of Deputy Surveyor, salary £150, rising to £200 by annual increments of £10 per annum.

Preference will be given to Candidates who have passed the Examination of the Institution of Municipal and County Engineers.

The Candidate to be appointed will be required to devote the whole of his time to the service of the Council, and must be ineligible for military service, or at least be placed in Grade 3.

Applications, stating age, whether married or single, previous experience and present position, accompanied by not more than three recent testimonials, must be received by me at the Municipal Buildings, Aldershot, not later than Wednesday, the 6th November, 1918, endorsed "Deputy Surveyor."

D. LLEWELLYN GRIFFITHS,
Clerk to the Council.

Municipal Buildings, Aldershot.
October 23, 1918. (3,901)

COUNTY BOROUGH OF BARNSLEY.

Wanted, power-driven washing machines (second-hand), capacity 200 shirt and 100 shirt; also Hydro-Extractor, 26-in. Cage (second hand).

State full particulars to J. Henry Taylor, borough surveyor, Barnsley. (3,900)

RECENT PUBLICATIONS.*

Coast Erosion and Protection. By Prof. E. R. Matthews, assoc.m.inst.c.e., &c. Price 12s. 6d. nett. London: C. Griffin & Co., Limited.

This is a second edition,—revised and enlarged, of a work which all engineers interested in sea defence works will wish to add to their library. To the municipal engineers responsible for the construction and maintenance of our sea coast defences it will prove not only interesting, but it will be found very useful.

The coast-line is constantly changing, and the engineer has to wage perpetual warfare against the destructive efforts of wind and tide. Erosion or accretion are taking place all round our coasts, and although we find erosion doing more damage on the east and south coasts than on the west coast, yet there are many towns and districts where erosion is taking place in one part of the district while accretion is going on within a short distance in the same district.

At the North Shore, Blackpool, erosion of the cliffs has been taking place so rapidly during the past few years that they are threatened with destruction, and the corporation are now carrying out sea defence works at a cost of about £50,000, so as to preserve the cliffs and tramway track adjoining. On the other hand, at South Shore, within a couple of miles of these cliffs, there was so much trouble with sand accretion that the enormous amount of filling required for the splendid promenade works carried out by the late Mr. Brodie was taken from the shore not only without doing the least damage to the level of the foreshore, but resulted in a great and permanent improvement.

Without going into too great detail, the book treats in a very interesting manner of the laws relating to wave-action and the destructive effect of impact of waves on sea walls. The erosion of the bed of the sea and the deposition of the eroded material, the harmful effect of the removal of shingle from the foreshore, and the damage done by drainage and land springs are briefly described.

Many types of sea walls are described and illustrated, and the dimensioned drawings given will be found very useful. As Mr. Matthews truly says, "It is impossible to calculate with any degree of accuracy the forces which act on a sea wall," and this especially applies when it is desired to frame a formula which will have general application. The formula given by Mr. Matthews of $\frac{H}{2}$ = thickness of wall at base has the merit of simplicity, and, as shown by the sections given in this book, many sea walls have been constructed to this formula with most satisfactory results. It is, however, obvious that this formula cannot be equally satisfactory with regard to a curved wall as it is to a straight wall, and that the experience of the engineer and local conditions must still be the main factors in the design of sea walls.

The four general types of sea wall to be found round the coast are given in the following order of merit: (1) Stepped face, (2) curved face, (3) sloping face, (4) vertical wall; the stepped face wall being found most satisfactory, as it breaks up the receding wave action and scouring action at the base of the wall. The materials to be used are briefly described, stone and concrete being almost universally used for town defences, though timber and groynes are largely used for the county districts in building land defences or raising the level of the shore. Concrete and timber groynes of various types are illustrated, and details of reinforced concrete walls, which are being increasingly used both in this country and on the Continent, are also given. The action of sea-water on cement and concrete is fully discussed, and most engineers will agree with Mr. Matthews in his preference for fresh water for concrete and cement work. The effect of harbour projections on the travel of sand and shingle, with experiments by means of models with regard to wave action on breakwaters of various profile, completes a work of great value to all engineers called upon to design or maintain sea defence works.

Rhyl's Sea-front Problems.—Mr. P. M. Crosthwaite, Local Government Board inspector, paid a visit to Rhyl last week, the *Liverpool Post* states, for the purpose of conferring with the urban district council as to their sea-front problems, which have become very acute owing to coast erosion and sand drift troubles. After making an inspection of the great damage done to a considerable length of the sea-wall and the encroachment of the sandhills on to the Marine-drive, he impressed upon the council the advisability of proceeding as early as possible with the sea wall repairs and the training of the river mouth under the supervision of an expert marine engineer. He did not, however, see any chance of a loan for sand-drift removal.

* Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

As the Government have lately fixed their own conditions for the employment of temporary clerks, fixing the hours to be worked per week, and the wages to be paid for the different grades, would it not be proper for them to go a step further and fix something of the kind for all classes of working men and women throughout the country? Would not such action tend to lessen labour unrest?

* * * *

Could we not well follow the Pennsylvania Highways Commissioners, who have decided to recommend a "sign board tax" on all roadside advertisements, the revenue derived to be devoted to road repairs? Why cannot legislation do something of the same kind in this country, though it is questionable if any tax could compensate for these unsightly aids to publicity?

* * * *

Who was it who could have inspired an article in the *Illustrated London News* of October 5th in which steel plates are advocated as road surfaces, and in which it is stated that "the steel roadway is nothing new, and where it has been laid down it has invariably proved successful"? Would it not have been interesting if the writer had told us where these steel plated roadways could be seen?

* * * *

Is it not satisfactory to learn with respect to my suggestion in the issue of The Surveyor of September 27th that a Government Department should prepare a small practical pamphlet on the subject of the utilisation of house refuse, that this has already been done; that the National Salvage Council of Caxton House, Tothill-street, S.W. 1, have already issued an exceedingly interesting leaflet dealing with the numerous uses to which house refuse can be put, and that this leaflet has been sent to local authorities all over the country? Should not everyone interested in the question of the stoppage of waste write at once for a copy?

* * * *

Has the borough surveyor of Bridgwater discovered a new metal in the mud of the River Parrett, when we see by a report of his paper read at the meeting of the Institution of Municipal and County Engineers, held at Bridgwater in September, that he stated "the solid matter contained in one cubic foot of the river water amounts to 680 lb"? As this represents about one-half the weight of gold, would it not be interesting to learn what is the composition of this solid matter, and how it leaves room for the water contained in the cubic foot from which it was extracted?

* * * *

Did not the *Blackpool Times* of October 2nd go "off the track" in an article on "Pupils in Public Offices," in which they expressed surprise that "an official like the borough surveyor of a town the size of Blackpool should have time to teach pupils" and seemed to infer that the late Mr. J. S. Brodie had no right to take fees from pupils, and thus supplement his salary? Is the editor of the *Blackpool Times* aware that it is a common practice for all engineers, including municipal engineers, to take articled pupils with a premium; and how does he suggest that young men should be trained in the complicated and arduous work of the profession without such a pupilage system?

* * * *

Is it not rather remarkable that one can hardly take up an American or Canadian engineering journal without finding an article, or report of a paper, dealing with the subject of concrete, and giving details of tests and experiments with this material? Are we in this country giving sufficient attention to this form of construction, and shall we be able to take the lead in this branch of engineering unless we take up the subject a little more seriously than hitherto?

Councillors' Interference with Workmen.—The vexed question of the interference of councillors with workmen was raised recently at the meeting of the Hornsea Urban District Council. When the chairman (Mr. W. Collinson) drew the attention of the chairman of the Highways Committee to the necessity of attention to some of the trees, Mr. Grainger replied that they had been told by an official that their duties as members of the council ceased when they left the council room, and if that was so, it was useless asking him to give attention to the matter.—The surveyor, Mr. W. E. Warburton, replied that what he desired to impress upon the members of the council was that no member should interfere with the workmen or give any orders to them. The officials, he said, looked to the members of the council to assist them, and if anything required alteration it would receive attention if reported to them. Mr. Grainger promised to inspect the trees mentioned, and the matter dropped.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

SURVEYOR'S CHIEF ASSISTANT.—November 2nd.—Middleton Town Council. £150 a year.—Mr. J. P. Walmsley, town clerk, Town Hall, Middleton.

BOROUGH ENGINEER AND SURVEYOR.—November 4th.—Pembroke Town Council. £150 a year.—Mr. R. D. Lowless, town clerk, Town Hall, Pembroke.

DEPUTY SURVEYOR.—November 6th.—Aldershot Urban District Council. £150-£200.—Mr. D. Llewellyn Griffiths, clerk, Municipal Buildings, Aldershot.

WATERWORKS FITTER AND TURNCOCK.—November 11th.—Tunbridge Wells Town Council.—Mr. W. H. Maxwell, borough engineer and surveyor, Town Hall, Tunbridge Wells.

ASSISTANT ENGINEERING FITTER.—November 11th.—Gosport and Alverstone Urban District Council.—The Surveyor, Council Offices, Gosport.

SURVEYOR'S ASSISTANT.—November 11th.—Gosport and Alverstone Urban District Council. £3 3s. per week.—Mr. H. Frost, surveyor, Council Offices, Gosport.

MOTOR ROLLER DRIVER.—Soke of Peterborough County Council.—Mr. Harry Russell, county surveyor, 45 Priestgate, Peterborough.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

BEDFORD.—November 13th.—For the erection of buildings and reinforced concrete coal bunkers.—The Engineer, Electricity Works, Cauldwell-road, Bedford.

Engineering: Iron and Steel.

LONDON.—October 29th.—For the supply of standpipes.—The Secretary, Office of Works, Storey's Gate, London, S.W. 1.

BEDFORD.—November 13th.—For the supply and erection of two water-tube boilers, mechanical stokers and induced draught plant.—The Engineer, Electricity Works, Cauldwell-road, Bedford.

Sanitary.

JOHANNESBURG.—January 8th.—For the supply of 5,000 sanitary pails with eyelet holes and lids for the same.—Department of Overseas Trade (Development and Intelligence), 75 Basinghall-street, E.C. 2.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

NOVEMBER.

11.—Surveyors' Institution: Mr. J. H. Oakley delivers his presidential address. 5 p.m.

APPOINTMENTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

SOKE OF PETERBOROUGH COUNTY COUNCIL. Wanted, a man for driving a Road Motor Roller, capable of doing "running repairs."

Apply, stating wages required, to Harry Russell, County Surveyor, 45 Priestgate, Peterborough. (3,899)

GOSPORT AND ALVERSTOKE URBAN DISTRICT COUNCIL.—Assistant Engineering Fitter in Charge required at the Air-Compressing Station, Westfield, Gosport.—Applications (on forms to be supplied), with other information, to be delivered at the Office of the Surveyor, Urban District Council, Gosport, not later than noon, November 11. (3,894)

WASTE PAPER IS A NATIONAL ASSET

It is required for munition and essential purposes in ever increasing quantities.

LOCAL AUTHORITIES, COUNCILS, &c.,

Having Waste Paper to dispose of should therefore send particulars to

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Offers to any of the above addresses will have immediate attention. EMPTY BAGS for Waste can be supplied where necessary.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. NOVEMBER 1, 1918. No. 1,398.

Minutes of Proceedings.

Housing in Greater London.

In the course of a speech on housing, which he delivered in March last, the President of the Local Government Board made a direct appeal to the London County Council that that body should undertake a comprehensive survey of the whole question of housing Londoners, including those who sleep outside the administrative county in the "dormitory" areas, but come into London every day to get their living. "I am sure," he said, "that this problem of housing in London must be approached from a far larger bird's-eye view than that of the bird who only looks at the administrative area of London, or who only looks to an area bounded by the jurisdiction of any particular borough council." As a consequence of this appeal a systematic investigation has been made by the Housing Committee of the London County Council, who have just issued a most exhaustive and interesting report. The problem of estimating the after-war housing requirements of Greater London is wellnigh insoluble, owing to the present abnormal war population on the one hand, and the complexity of the forces at work which will lead to large movements of population at the end of the war on the other. For example, it is probable that the cessation of hostilities will cause an immediate and appreciable reduction in the population of a borough like Woolwich, with the consequent vacation of many houses which have been specially built by the Government for the accommodation of munition workers. Other causes, such as the marked reduction in the natural rate of increase in the population, and the expected impetus in emigration will no doubt operate in the same direction. But, as the report points out, the position is fraught with the greatest uncertainty, because the greater a city the more liable it is to changes due to world movements and events, and no world event has been so great as the present war, of which the end and the results are not yet visible. In these circumstances, the existence of such a report as that before us, dealing as it does in detail with the growth of population, existing housing conditions, the several agencies providing housing, rents and rates, locomotion facilities, and land available for housing purposes, will prove invaluable in meeting conditions which, although they cannot yet be accurately foreseen, will have to be dealt with promptly when they arise. The Housing Committee are to be congratulated on a very useful piece of work, well and thoroughly done.

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Town Planning and Reconstruction.

In addressing the members of the Town-Planning Institute at the recent general meeting of that body, Prof. S. D. Adshead, F.R.I.B.A., the president directed attention to some of the immediate issues in reconstruction which relate to the problem of town planning. The Ministry of Reconstruction, being an advisory and not an executive body, have, as is well known, appointed a large number of committees to examine and report upon various problems that will arise upon the termination of hostilities. Many of these problems have a direct or indirect connection with town planning in its wider aspect. One or two examples at once occur to the mind of anyone at all familiar with modern town-planning ideas, such as housing, coal, and industrial development generally. With regard to the first named, Prof. Adshead had no serious fault to find with the Government scheme, save that it appears that little or no attempt is being made to secure that the 300,000 houses which it is proposed to erect shall be built on the most scientific lines as regards either siting or construction. Again, with regard to coal, the report of the Coal Conservation Committee contains a map showing the location of proved concealed coalfields, and also all those areas where possible new coalfields and extensions exist. Take, for example, the case of Kent, where the time is ripe for the preparation of schemes of development on a regional basis. To quote Prof. Adshead, if planned with due consideration to cleanliness, hygiene, economy, and all the advantages that are offered by the application of modern science, and to a well-thought-out regional plan, there is no reason why industrial Kent, even though it may lose some of its cobnuts, hops and even hedgerows, should not still be a county of model villages, chalk cliffs, marshes, and hazel woods very much as it is to-day. Having regard to the number of other questions with which town planning is involved, it is perhaps a pity that the Ministry of Reconstruction have not as yet appointed a special committee to deal with the whole subject and particularly with such important problems as regional planning, or the distribution, relation and structural development of towns.

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The L.C.B., 1917-18.

In another column will be found some extracts from the report of the Local Government Board for 1917-18, from which it appears that, although many of that authority's normal activities have been practically suspended, its attention has been very largely occupied by special work arising out of the war. We shall content ourselves here by referring to one or two matters of special interest, leaving our readers to go to the report itself—and it is a most interesting document—for information with regard to the work of the board generally. In the first place, reference is made to the metropolitan water supply, the quality of which has remained entirely satisfactory in spite of weather conditions in the early part of the year that were not favourable to filtration. This is attributed to the results of the experiments made in 1916 by Sir A. C. Houston in the treatment of unfiltered water by chlorine—a process which has not only been continued as regards Thames water, but has on occasion been extended to the New River supply. The continual falling off in the execution of works of a capital nature by local authorities is reflected in a further reduction in the total amount of loans sanctioned to a figure approximately 20 per cent less than that for the preceding year. In view, however, of the preparation of a classified list of works for execution after the war, it is probable that the cessation of hostilities will witness something like a boom in applications to borrow money. That part of the report which deals with housing is concerned principally with the after-war problem as to which we have kept our readers fully informed. The restriction of the normal activities of the board has rendered it possible for their excellent staff of engineering inspectors to give special war service to other departments and on several of the many special Government committees that have been set up. Our readers will look forward to the time when these inspectors will resume their normal work of holding inquiries regarding the numerous works which local authorities will have to undertake with the least possible delay upon the conclusion of peace.

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Municipal Corporation's Right to Damages.

Whether a municipal corporation is enabled to recover full damages under Sec. 20 of the Gasworks Clauses Act, 1847, or only the nominal damages prescribed by the enactment seems to have been settled for the time being in the negative by a decision given recently in the King's Bench Division. The action was one in which the Birmingham Corporation sued Samuel Allsopp and Sons, Limited, for damages caused to a section box attached to an electric standard belonging to the corporation by a motor lorry belonging to the defendant company. The damage was estimated at £29 11s. The section of the Act provides that every person who shall carelessly or accidently break or damage any pipe, pillar or lamp belonging to the undertakers, or under their control, shall pay such sum of money by way of satisfaction to the undertakers for the damage done, not exceeding £5, as any two justices shall think reasonable. The corporation recovered £5 in due

course, and afterwards brought an action in the County Court to recover £24 11s., the balance, and for this they also obtained judgment. On an appeal by the defendants, this latter decision has, however, been set aside, Mr. Justice Rowlatt stating that while it was clear from the Crystal Palace case quoted that the common law remedy of damages for negligence was not ousted by Sec. 20 of the Act of 1847, when a person had been awarded a sum of money as in the present case, "it was by way of compensation and satisfaction." Mr. Justice McCardie proceeded to emphasise this ruling by insisting that "by way of satisfaction" meant full satisfaction, so it seems clear that in such actions the Crystal Palace judgment is accepted as conclusive. To the layman the law as constructed would appear to lay it down that full satisfaction and partial satisfaction are convertible terms.

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Proportions for Concrete.

It will come as a surprise to many engineers to learn that the method of proportioning concrete by volume, as commonly specified and used, is not only illogical and unscientific, but also unfair to the development of the true value of the materials. This, however, is the conclusion that has been reached by Mr. L. N. Edwards, of the Toronto Department of Works, as a result of a series of careful and elaborate tests, which show what the more scientific method is to proportion the cement in relation to the surface area of the aggregate. At the recent annual meeting of the American Society for Testing Materials, Mr. Edwards presented a paper entitled "Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates," treating the subject of proportioning from this new point of view, and including a description of his tests, which give ample proof of the correctness of the theory involved. The "surface area" method is certainly worthy of the most careful consideration by the engineering profession, and we strongly commend Mr. Edwards' paper to the attention of our readers. In the course of the paper Mr. Edwards quotes from Prof. A. H. Heath to show that the primary idea of the method is at least twenty-five years old, although it has hitherto remained undeveloped. This has led our contemporary the *Canadian Engineer* to propose that it should be known as the "Heath-Edwards" method—a suggestion that we hope may be adopted.

LONDON'S WATER.

DAILY CONSUMPTION OF 255,000,000 GALLONS.

The Local Government Board receive regularly from Mr. C. Perrin, M.INST.C.E., the examiner under the Metropolis Water Act, 1871, monthly reports containing details as to his examination of the water supplied by the Metropolitan Water Board.

Referring in their annual report—issued this week—to Mr. Perrin's report for the year 1917, the Local Government Board say it appears that the average daily supply of water within the area of the water board during that year was 255,873,781 gallons for a population averaging 6,786,821 persons in 1,131,452 houses, representing an average daily consumption of water of 37·70 gallons per person and 226·10 gallons per house for all purposes.

Of the total number of houses within the area of the Water Board supplied with water in 1917, 1,121,397, or 99·1 per cent. had a constant supply.

The storage accommodation possessed by the water board in 1917 amounted altogether to about 12,937,000,000 gallons of water, comprising some 59·8 days' supply in the northern districts, 15·7 days' supply in the western districts and 37·5 days' supply in the southern districts.

The examination of the water has been regularly carried out under the superintendence of Sir A. C. Houston, K.B.E., the water board's director of water examinations, and the scope of the work has been greatly extended. Although it has been impracticable to obtain a special report on the examination of the water during 1917, Mr. Perrin reports that in spite of the extremely unfavourable character of the weather during the early months of the year and the consequent difficulties in filtration, the quality of the water supplied was fully up to the average of the previous years. This is attributed to the results of the very successful experiments made by Sir A. C. Houston in 1916 in the treatment of the raw water by chlorine. The process was continued in regard to the Thames water, and whenever the Lee was in bad condition was extended to the New River water with excellent results.

Damage to Roads by War Office Haulage.—At the last meeting of the executive meeting of the County Councils Association a resolution was passed objecting strongly to the refusal of the Government to accept liability for damage done by timber-hauling on roads and bridges prior to March last except in special circumstances. The War Office and the Treasury are to be asked to receive a deputation.

COMBINED OR SEPARATE SEWERAGE SYSTEMS.

In an effort to lay down somewhat definite principles for guidance in determining whether the combined or separate sewerage system should be adopted, the Engineering Department of the Bureau of Industrial Housing and Transportation of the United States Department of Labour has issued the following tentative instructions:—

CONDITIONS FAVOURING SEPARATE SYSTEM.

The separate system of sewers is indicated as most desirable when the following conditions obtain:—

Where the storm water does not require extensive underground removal, or where it can be concentrated in a few shallow underground channels.

Where drainage areas are short and steep, facilitating rapid flow of the water over street surfaces to the natural water courses.

Where the sanitary sewage must be pumped and additional cost of pumping even of a small amount of storm water is great.

Where the sanitary sewage must be purified and storm water in a combined system either purified or by-passed—either scheme requiring large purification plant capacity or creating nuisance due to the overflow of objectionable refuse.

Where the sewers are being built in advance of a city's development to encourage growth, the separate system often provides a maximum number of miles of sewer for a minimum of expenditure.

The storm sewers, if ever required, may be gradually introduced later and rarely need to cover over about one-half the area covered by a sanitary system. This consideration, however, is not always applicable to the present intensive and complete housing development schemes.

A combined system of sewers must usually be relatively of larger capacity than a separate storm drain for the same area, because the storm drain may be overloaded at long intervals with slight inconvenience, whereas in a combined sewer any overflow is accompanied by a great nuisance and complaint owing to basement connections and consequent liability of flooding.

In general, rather rough topography with marked natural drainage and open spaced residential settlement not likely in the future to become dense, together with the desirability of sewage treatment indicates the separate system as the method most desirable.

CONDITIONS FAVOURING COMBINED SYSTEM.

The conditions that indicate that the combined system is the one most desirable are as follows:—

Where it is evident that both storm-water drains and sanitary sewers must be fully and completely installed throughout the entire length of the street in the district, it is obvious that the total cost will be far greater for the separate than for the combined system.

Where no pumping or purification is required at present or is anticipated in the future.

In general, flat topography without natural drainage and with dense settlement, or future liability to dense settlement, together with the lack of necessity of sewage treatment indicates the combined system as the method which is desirable.

COMBINATION OF TWO SYSTEMS.

The selection of system to be adopted should not follow hard and fast rules. Often in the same development it may be desirable to provide in one part the separate system, in another part the combined system, and still in another part a combination of the two methods. Occasionally a combined sewer may be introduced in a separate system to advantage with interception of its natural flow at some point before the outlet is reached. The economical and efficient method is only arrived at by outline design and cost comparisons of different projects.

COMBINED SYSTEMS AND TREATMENT PLANTS.

It does not always follow that where sewage treatment is involved the selection of the separate system is imperative. It is usually desirable, but cases may arise where the combined system should be adopted although sewage treatment in some form is necessary. This latter condition will be the same ordinarily where—

(1) All streets must have storm water removal.

(2) Where very complete treatment is not necessary.

(3) Where high-grade effluent from the treatment plants is not warranted.

(4) Where storm flows can be safely and properly by-passed into flooded streams.

(5) And in general where cost of treatment works (considering operation as well) for a somewhat large normal flow are obviously less than the cost of duplicate sewers in full throughout the district drained.

Local Government Board Activities in 1917-18.

EXTRACTS FROM THE FORTY-SEVENTH ANNUAL REPORT.

In their forty-seventh annual report, issued this week, the Local Government Board pay a warm tribute to the manner in which the local authorities of England and Wales and their officers have co-operated with them under circumstances of special difficulty consequent on serious depletion of staff and other causes, in dealing with the new work which has arisen out of the war. The board's report is divided into four parts. Part I. relates to public health, local administration, including loans sanctioned to local authorities (mainly for the purposes of the war), and local taxation and valuation. Part II. relates to matters incidental to the administration of the Housing of the Working Classes Acts, 1890 to 1909, and of Part II. of the Housing, Town Planning, &c., Act, 1909, which deals with town planning. Part III. relates to the administration of the Poor Law and Old Age Pensions, and Part IV. relates to special war work. The board have again excluded much matter relating to the normal activities of the department, most of the tables and statistics, and the circulars issued during the year, which are usually comprised in the Report or included in its Appendices, being omitted.

LOANS TO LOCAL AUTHORITIES.

During the year under review the board have continued the policy of endeavouring to secure the postponement by local authorities of all works except such as were of pressing necessity either for reasons of public health or on account of war requirements. The increasing shortage of labour and materials renders it more than ever necessary that this policy should be strictly maintained.

Under the terms of their circular of March 25, 1915, the board resanctioned during the year the raising of loans amounting to about £80,000 as compared with the sum of £250,000 in the previous year. In the case of expenditure on works which had not been commenced the greater part of the loans sanctioned during the year was for purposes connected with the production of munitions of war, such as the extensions of gasworks and gas plant and electrical plant and cables. A relatively small amount was for road improvements, rendered necessary to meet the heavy additional traffic caused by the creation of camps and munition factories.

Details of the loans sanctioned to local authorities (including county councils but excluding poor law authorities) during the year are as follows: Purposes in connection with the war, £1,860,361; public health, £57,239; liabilities previously incurred, £84,473; reborrowing of loans called in, £79,985; sea defence works, £12,131; fire brigade purposes, £3,860; road improvements, £36,862. Total, £2,134,911.

REGISTER OF WORKS TO BE EXECUTED AFTER THE WAR.

The work of classifying and tabulating the information contained in the returns received from local authorities in reply to the board's circular letter of August 28, 1916, has been continued during the year and practically completed.

GAS STANDARDS.

In addition to the cases mentioned in their previous report, the board have issued Orders under the Gas (Standard of Calorific Power) Act, 1916, upon the application of the town councils of Birkenhead, Birmingham, Blackpool, Bolton, Salford, Southport, Stourbridge and West Bromwich, and the urban district councils of Bingley and Shipley. The Orders have prescribed a standard of calorific power of 500 British thermal units, and have imposed upon the local authorities the obligation to supply gas at a pressure of not less than $\frac{15}{10}$ in. Before making the order the board ascertained from the Ministry of Munitions that the local authorities had taken such action for the production of benzol and toluol as is contemplated by Section 1 (2) of the Act.

LOCAL TAXATION RETURNS.

In pursuance of Sec. 13 (1) of the Local Government (Emergency Provisions) Act, 1916, there has been a temporary cessation of the publication of the separate volumes making up the Annual Local Taxation Returns (England and Wales), and showing the receipts, expenditure, and outstanding loans of each county council, town council, urban district council, rural district council, and board of poor law guardians, and the financial transactions and outstanding loans of all other local authorities. The board state, however, that summaries of the Returns for 1914-15 and 1915-16 are in preparation.

HOUSING.

The board remark that the subject of the housing of the working classes has received further consideration during the year to which their report relates, not only by themselves but also by the War Cabinet, and considerable progress has been made.

LOANS SANCTIONED DURING THE YEAR.

The particulars given in the board's last report indicate that the restriction on borrowing which the Treasury had found it necessary to impose had practically resulted in the limitation of the loans sanctioned by them under this part of the Act of 1890 to the cases of housing schemes urgently needed in connection with war requirements. But no new schemes, even of this character, were undertaken by local authorities during the year to which the present report relates, and the only loans sanctioned during the year under Part III. of the Act were small loans to four urban authorities, amounting in all to only £3,363, for the purpose of defraying excess expenditure on schemes which had previously been executed, and a loan of £289 to a rural district council for the purchase of land which had been acquired by them in 1914 as a site for working-class dwellings, the amount of the purchase money which it would be necessary to raise by means of a loan having only recently been definitely ascertained.

LOCAL AUTHORITIES AND AFTER-WAR HOUSING.

The practical cessation throughout the country of the erection of working-class dwellings, whether by private enterprise or otherwise, the high rate of interest on borrowed money and the greatly increased cost of building likely to prevail for a considerable period rendered the general question of housing after the conclusion of the war one of the most difficult and perplexing of the problems to be faced in connection with any scheme of reconstruction, and the matter was receiving the board's most anxious attention and consideration. The report continues:

"It is generally recognised that for some time after the end of the war many of the difficulties which have brought the building of houses almost to a standstill will continue to prevail, and that throughout the period of the war, so far as working-class dwellings are concerned, there will be an increasing arrear of building which will have to be subsequently overtaken.

"The question of the provision of these houses appears to us to be one of the most pressing of post-war problems for which immediate preparation should be made. Realising that private enterprise, to which we owe approximately 95 per cent of our house building prior to the war, will be quite unable to grapple successfully and speedily with this arrear, we came to the conclusion that in the years immediately following the war it would be necessary to rely far more than in the past upon local authorities to provide the houses required, with their road, water and drainage accompaniments.

"Having brought the matter before the War Cabinet, our president was authorised to say that the Government recognised that it would be necessary to afford substantial financial assistance from public funds to those local authorities who are prepared to carry through without delay at the conclusion of the war a programme of housing for the working classes which is approved by us; and in conveying this decision to the local authorities in a circular dated July 28, 1917, we invited those authorities who were of opinion that there was a housing need in their area, and desired to share in the financial assistance referred to above, to furnish us with certain information as to the needs of their districts with a view to our further consideration of this important matter upon a more definite basis.

"We added that in thus addressing ourselves at the outset to the local authorities we were fully conscious that the complete solution of the housing problem is not likely to be accomplished except with the co-operation of private enterprise, including public utility societies, and that in order to secure the full advantage of their help it might be advisable for the State to offer them assistance.

"Of the 1,806 local authorities to whom the circular was sent some 1,625 have furnished replies, and of these no less than 1,130 record a need in their districts for additional housing accommodation for persons of the working class, while over 1,000 have indicated their willingness to carry out schemes for the provision of working-class dwellings on the conclusion of the war, on the assumption that financial facilities will be provided by the Government."

COMPULSORY PURCHASE OF LAND.

No applications were received by the board during the year for the confirmation of orders made by local authorities for the compulsory purchase of land for the purposes of Part III. of the Act of 1890.

TOWN PLANNING.

As in the case of housing so in regard to town planning the deterrent effect of the war is evident, but the board think it very desirable, in view of probable developments after the war, that local authorities should take every possible opportunity to advance their town-planning schemes in order that when the opportunity occurs progress with

building operations may be made without delay in accordance with the provisions of the schemes.

SCHEMES AUTHORISED.

Town-planning schemes to the number of 139 had been authorised to be prepared or adopted by ninety local authorities since the passing of the Housing, Town Planning, &c., Act, 1909, the acreage of the areas dealt with totalling 22,536.

In only ten of the cases in which authority to prepare schemes had been given since 1911 had schemes been submitted for the board's approval. Of these ten schemes four were prepared by the Corporation of Birmingham (including an amendment scheme), and the other six by the Corporations of Rochdale and Chesterfield, the urban district councils of Ruislip-Northwood, North Bromsgrove, and Otley, and the rural district council of Hunslet. Two of the Birmingham schemes—viz., the Quinton, Harborne and Edgbaston scheme and the East Birmingham scheme, and also the Rochdale (Marland), the Ruislip-Northwood, the North Bromsgrove (Rubery) and the Chesterfield (Chester-street area) schemes had passed through all their stages, and had been finally approved. The remaining schemes—viz., the Birmingham (North Yardley and Stechford scheme), the East Birmingham amendment scheme, and the Otley and Hunslet (Templenewsam) schemes—were in various stages of progress at the end of the year.

During the year ended March 31st last the board gave authority for the preparation of only one scheme, by the urban district council of Elland in respect of an area of 306 acres.

APPLICATIONS UNDER CONSIDERATION.

In addition to the case above mentioned the board had under consideration at the end of March nine applications by local authorities for authority to prepare schemes in respect of areas comprising in all more than 23,000 acres of land, namely: Bradford (2,920 acres), Derby (7,239 acres), Leeds (657 acres)—corporations; Abercarn (374 acres), Bingley (5,488 acres), Chiswick (184 acres), Clayton (987 acres), Shipley (750 acres)—urban district councils; Hendon (5,044 acres)—rural district council.

Preliminary notices had also been given under the Regulations by the following twenty-five local authorities with a view to application being made to us for authority to prepare schemes, namely: Birkenhead, Chesterfield, Chorley, Coventry, Middlesbrough, Ramsgate, Reigate, Shrewsbury, and Southend-on-Sea corporations; Acton, Barking Town, Barnes, Barry, Finchley, Hayes, Hendon, Market Harborough, Shoeburyness, Wembley, Willesden, and Wood Green urban district councils; and Eastry, Hunslet, Tadcaster, and Warrington rural district councils.

UTILISATION OF GARBAGE.

INTERESTING FACTS FROM AMERICA.

[The Director-General of National Salvage sends us the following summary prepared by his department from a mass of information supplied by the United States Food Administration through the courtesy of their officials both in Washington and at the American Embassy in London with regard to garbage utilisation in the United States.]

The term "garbage" means all refuse accumulations of animal or vegetable matter intended for human food.

More garbage is produced in the South than in the North, the season for vegetables and fruit being longer.

Twenty-two per cent of the cities of over 10,000 population are contemplating changes in their methods of disposal. The United States has 596 such cities. The United Kingdom has 539. Principal methods at present are: (1) Incineration. (2) Reduction. (3) Feeding. As regards the second, grease is recovered and residue used for fertiliser. As regards the third, it is usually fed to pigs. It is also being successfully fed to chickens, sheep and cattle. Production of garbage is approximately 200 lb. per annum per head.

The cost of separate collections is 7 cents = 3½d. per head per year more than combined collections, but the total cost of combined collection with incineration is estimated at 68 cents = 2s. 10s. per head per annum, whereas the cost of separate collection with utilisation is only 33·4 cents = 1s. 4¾d. per head per annum.

With separate collections one set of vehicles removes only garbage, another only ashes, and the third rubbish.

In cases where this method is adopted, some local authorities appear to refuse to remove the refuse if it is mixed.

INCINERATION.

There are sixty-six cities in the United States of over 100,000 (and sixty-nine in the United Kingdom). Of these sixty-six, twenty-five are either burning or dumping their refuse, against sixty-two in the United Kingdom.

The cost of installation is comparatively high, as is the cost of operation, and while some plants are selling the steam generated, no plant is covering cost.

Incineration has proved a failure in a number of cases and a large number of plants have been abandoned, but it is stated that this method is capable of being conducted on a high sanitary plane. It is only sanitary when properly worked.

REDUCTION.

Garbage containing no free moisture has a water content of 70 per cent.

The necessary apparatus is costly and operating charges are high. Approximately a 100,000 population must be available to make reduction plant commercially feasible. Twenty-nine of the larger cities have such plant, producing 72,000,000 lb. of grease and 150,000 tons of fertiliser tankage, the total value of recovered products being approximately £2,000,000. Reduction plant has been much improved in recent years, and many plants are now being operated without nuisance.

On the whole it is thought that reduction plants are more suitable for towns of over 100,000 inhabitants, and feeding to pigs more suitable to towns under 100,000.

DISPOSAL BY FEEDING.

Thirty per cent of the cities of over 100,000 inhabitants, and 36 per cent of cities under 100,000 dispose of garbage by feeding to pigs; altogether 220 cities out of 596 are now feeding to pigs, the waste food of over 8,000,000 people producing a pork value, reckoning 50 per cent efficiency, of £1,250,000.

The average ration is 20 lb. per animal per day. Reckoning on the production of garbage in the United States twenty to thirty pigs can be fed by 1,000 population.

A gain of about 1 lb. per day can be expected with growing pigs.

One ton of garbage is approximately equal to 100 lb. live-weight grain. This means one ton of garbage consumed, and not one ton produced, which with utmost care contains a certain proportion of edible garbage. Recommended as a conservative figure, take 50 lb. of garbage to equal 1 lb. live weight.

It has been found useful to put labels on the garbage pails indicating that garbage is fed to pigs, and that foreign matter must not be put in garbage pails. Phonograph needles and glass from electric light bulbs are frequently found in the garbage, and are of course very harmful.

Garbage should be drained of water by the householders.

Receptacles should be made of metal and kept water-tight.

Collections should be made in Northern cities (that is in Northern cities in the States) three times per week. In cold weather once a week is sufficient from the feeding point of view, but household requirements warrant two collections a week.

Municipalities generally overcome difficulties better than a contractor.

If a municipality does not itself keep pigs, it has been found advisable to sell garbage to one contractor only instead of to many contractors.

Monetary value of garbage is frequently exaggerated. In many cases it is questionable whether it pays cost of collection and transportation.

If garbage is disposed of to a contractor, it should be for a period of years, and not for one year only, otherwise the contractor must cover the cost of his equipment in the price paid. Having done so in the first year, he can then under-bid his competitors and thus reduce the competition for the garbage.

Care should be taken in selection of pig farms, which should be preferably on sand or gravel or soil that drains rapidly. Good drainage is essential.

Garbage-fed hogs require abundant drinking water.

In feeding out of doors, in all but extreme weathers, fifty pigs per acre may be reckoned, but under cover from 400 to 600 per acre.

Under no condition should animals be kept in small pens except for fattening stock for a limited time.

Frozen garbage is undesirable.

Pigs do not do as well on sterilised garbage and the losses are heavier. At practically all the large farms sterilisation plants, although installed at considerable expense, are no more used.

Pigs can be successfully fed on garbage only.

Practically every breed is being fed successfully on garbage.

Roads in Hong Kong.—An American Consular report states that considerable attention has been given to highways by the Government of the colony of Hong Kong for some years past, and that within the past three years great progress has been made in extending the mileage of roads. This has been due very largely to the demand from motorists for highways to carry pleasure traffic. From a few miles of available highways the mileage has increased to 110, and plans have been made for the building of about 35 miles more. On the island, and to some extent on the mainland, asphaltic wearing surfaces are being laid on concrete foundations. The climatic conditions are especially severe, as the rainfall averages 80 in. annually.

Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates.

By L. N. EDWARDS.*

Doubtless the method of proportioning the cementing material and aggregates by volume originated among the early artisans. However, the earliest authentic record of its use is credited to General Pasley (1827). This method as commonly specified and used is not only illogical and unscientific, but also unfair to the dovelopment of the true value of the materials entering into the composition of both mortar and concrete.

Those having experience in practical tests of mortar and concrete know that with given volumetric proportions of materials comparatively slight variations in the granulometric composition of the sand aggregate produce marked differences in the strength, toughness, and other physical properties of the product.

There should be no place in engineering for guesswork and empiricism whenever scientific determination is possible. With this idea in mind and with a due allowance for the practical considerations mentioned above, it remained to set about the task of finding a structural reason for the wide variations of strength obtained in mortar tests. In November, 1917, a most natural solution presented itself—namely:—

(1) The strength of mortar is primarily dependent upon the character of the bond existing between the individual particles of the sand aggregate. Upon the total surface area of these particles depends the quantity of cementing material. Furthermore:

(2) The amount of water required to produce a "normal," uniform consistency of mortar is a function of the cement and of the surface area of the particles of the sand aggregate to be wetted.

This idea of proportioning the cement in relation to the surface area of the aggregate was new to the author and appealed to him as a reasonable, although rather radical, departure from the time-honoured practice of proportioning by volume measurement. However, he discovered in February, 1918, that it is in reality at least twenty-five years old. Prof. A. H. Heath describes it very clearly in his book.†

No attempt was made by Prof. Heath to develop the surface-area method of proportioning, of which he was a pioneer or possibly the originator.

This paper presents the results of tests made by the City of Toronto Department of Works, under the direct supervision of the author.

OBJECT AND SCOPE OF TESTS.

The tests were made with the object of developing the surface-area method of proportioning and securing information relative to (1) the surface area of aggregates of varying granulometric composition; (2) the quantity of water necessary to produce a "normal," uniform consistency of mortar for varying sands and cement content; and (3) the strength of mortar attained by varying the proportion of cement in the mix.

The range or scope of the tests was sub-divided as follows:—

(1) The determination of the average surface area of sand and stone particles of varying sizes based upon an actual count of the number of particles in given weights.

(2) The determination, by trial, of the quantity of water necessary to produce, for any given sand and proportion of cement, a mortar of "normal," uniform consistency.

(3) The determination of the reliability of the surface-area method of proportioning mortars in so far as strength alone is concerned.

(4) The determination of the relative strengths resulting from variations in the cement content of mortars within practical limits.

(5) The securing of miscellaneous general information pertaining to the foregoing phases of the tests.

The investigations herein described involve compression and tension tests upon 240 mortar cylinders, 2 in. in diameter by 4 in. long; 45 concrete cylinders 6 in. in diameter by 12 in. long; and 324 standard briquettes.

SURFACE AREA OF AGGREGATES.

The fact that the relation of the surface areas to the volumes of particles of matter depends upon their size and shape needs no demonstration.

The shapes of particles of sand and of stone aggregates are infinite in number, and for this reason no accurate determination of their surface areas is possible. However, it is reasonable to assume that these areas can be closely approximated. Doubtless these approximate areas do not vary greatly from the true areas in the finer particles of sands, since these particles, when examined under the microscope, appear more nearly spherical than do the larger particles of sands and of gravels.

Surface Area of Sand Aggregate.—As a preparation for the securing of information from which it would be possible to compute the approximate average surface area of sand particles of varying sizes (the exact area cannot be determined) samples of natural sands were secured from different localities. Each sand was thoroughly dried and divided by sieving into its component sizes.

For each sand the average number of particles per gramme was determined, for every size of each sand, by an actual count.

The number of particles per gramme having been determined as above described, the volume per particle was computed.

The average volume per particle being determined, the shape of the particles was assumed as spherical and the surface area per particle and per gramme of sand was determined accordingly.

Surface Area of Stone Aggregate.—The shapes of particles of broken stone and of natural gravels are dependent mainly upon the character of the rock material of which they are composed, whether of igneous or of sedimentary origin. In the determination of average surface areas the particles of broken stone were assumed to be made up of one-third cubical and two-thirds parallelepipedal shapes, the latter subdivided to approximate more closely the areas of the elongated and slab-like shapes of particles. Gravel particles were assumed as spherical in shape.

COMPOSITION AND PREPARATION OF TEST SANDS.

The grading of the sands used in the tests was not predetermined. In combining the portions retained upon each sieve an effort was made not only to provide a range of gradings comparable with the usual gradings of natural sands, but also to include a few rather irregular or "freak" gradings.

The grading of a test sand having been decided upon, and the quantities of the component sizes having been computed and weighed, a uniform, composite sand was produced by hand-mixing.

TEST SPECIMENS AND TESTING.

The test specimens made in connection with the various tests were as follows:—

(1) For the mortar consistency tests, standard briquettes only.

(2) For the mortar strength tests, standard briquettes and cylinders 2 in. in diameter by 4 in. long.

(3) For the concrete tests, cylinders 6 in. in diameter by 12 in. long, and from the mortar content of the excess concrete cylinders 2 in. in diameter by 4 in. long.

In all compression tests a spherical seated bearing block was used and the ends of the specimens were bedded with sheets of beaver board to secure an even distribution of the load.

In all mortar tests, except the so-called "consistency tests," four 2-in. cylinders and four "standard" briquettes were tested at each age of 7, 30 and 60 days. Only briquettes were used in the mortar consistency tests. In the concrete tests five specimens were tested at each age.

For all tests the maximum load at ultimate failure was recorded.

PREPARATION OF TEST SPECIMENS.

In the preparation of test specimens a special effort was made to do the work with the greatest dispatch, consistent with the securing of uniform results. The mixing of the materials and the making of test specimens was the work of two operators.

Concrete Proportioning, Mixing and Placing.—The materials for concrete were proportioned as follows:—

Cement, 21·12 lb. per 1,000 sq. ft. of surface area of sand aggregate (1 g. cement to 15 sq. in. area). For the portion of sand passing a No. 100 sieve the surface area was assumed to be the same as that of an equal portion of material passing a No. 80 and retained upon a No. 100 sieve.

Sand and stone aggregates, 1 part sand to 2 parts stone by volume.

In order to secure greater uniformity these volumes were reduced to a unit weight basis. These unit weights were as follows:—

1 cub. ft. sand assumed at 100 lb.
1 cub. ft. stone assumed at 87 lb.
1 cub. ft. water assumed at 62·37 lb.

The water content of the mix was sufficient to produce a saturated, sticky, semi-plastic mortar showing no free water.

It will be noted in the above that in the proportioning of the cement content of the mix no account was taken of the surface area of the stone aggregate. At the time of making

* From a paper presented at the annual meeting of the American Society for Testing Materials.

† "A Manual of Lime and Cement," 1893.

the test specimens the approximate areas of broken stone and gravel aggregates had not been determined.

The concrete was mixed by hand. The cement and sand were first incorporated to form a mixture of uniform colour. Water was then added to form a mortar, into which the broken stone, after it had been surface-moistened, was shovelled and the mixing of the entire mass continued until the particles of stone aggregate were thoroughly coated with mortar.

In the puddling of the concrete in the forms special attention was given to the uniform distribution of the broken stone and mortar. Bars having a diameter of $\frac{5}{16}$ in. to $\frac{3}{8}$ in., flattened to form a comparatively thin blade-like end, were used to secure this distribution. Compacting and the exclusion of entrapped air were mainly accomplished by lightly tapping the exterior surface of the forms with a wooden mallet.

From the excess concrete remaining from each batch after the 6-in. cylinder forms were filled an amount of mortar sufficient to fill twelve 2-in. cylinder moulds was secured. The larger stone particles of the concrete were removed by screening upon a $\frac{3}{8}$-in. screen.

The forms were removed from the test specimens forty-eight hours after filling. As soon as removed from the forms the concrete test specimens were marked for identification and placed in storage, where they were moistened three times per day by spraying, until required for testing. The mortar cylinders, upon their removal from the moulds, were immersed in water.

MORTAR CONSISTENCY TESTS.

The marked influence of the consistency of the mix upon the ultimate strength of mortars renders it especially important that test mortars be made of uniform consistency. The importance of this investigation as a preliminary to the making of tests tending to prove or disprove the validity of the primary theory of the surface-area method of proportioning is self-evident. Tests were therefore made with the object of developing a means of securing uniformity of consistency in accord with the secondary or consistency theory of this method of proportioning—that is, "The amount of water required to produce a normal, uniform consistency of mortar is a function of the cement and of the surface area of the sand aggregate to be wetted."

As a result of the preliminary tests it was found that "normal," uniform consistency mortars of varying cement content and of varying sand gradings were produced when the quantity of water used in the mix was made equal to (1) that required to reduce the cement to a normal consistency paste, plus (2) an amount equal to the surface area of the sand in square inches divided by 210.

MORTAR STRENGTH TESTS.

The means of securing a "normal," uniform mix having been determined, little difficulty was encountered in the preparation of test mortars intended to establish the efficacy of the primary theory of this method—namely, "The strength of mortar is primarily dependent upon the character of the bond existing between the individual particles of the sand aggregate. Upon the total surface area of these particles depends the quantity of cementing material."

It is evident that, if the primary theory of this method of proportioning is correct, the ultimate strengths obtained from the first series of tests will be uniform and equal. It is equally evident that the relation of the ultimate strength to the cement content of the mortar is securable from the results of the second series. However, it must be borne in mind that the strengths obtained in each series are not necessarily the same as those which might be obtained from the use of a sand having its origin in a different rock material. The third series of tests provides a means of comparing the ultimate strengths obtained from mortars of normal consistency with those obtained from the mortar content of concretes forming a part of the general tests herein described.

CONCRETE STRENGTH TESTS.

The weaker strength of the concretes as compared with the mortars is doubtless due in part to the weakening effect of cleavage planes produced by the stone aggregate. A comparison of the strengths indicates a probability that by this method of proportioning the relative values of sands for use in concretes can be determined from a comparison of mortars, the cement content of which bears a common ratio to the areas of the sands compared and the water content of which is the same as that to be used in the proposed concrete.

OBSERVED PHENOMENA OF TESTS.

Voids in Mortar.—Mortars produced under ordinary conditions invariably contain voids having two general sources of origin, namely: (1) Those due to globule-like accumulations of water which evaporate, leaving so-called water voids, and (2) those due to air adhering to the surfaces of the sand particles or to air entrained during the mixing of the component materials, producing air voids.

Resistance to Impact.—Hardness, toughness, &c., were roughly tested under the impact of hammer blows, "knob" ends of briquettes and fragments of broken cylinders being used for this purpose. Mortars having an equal cement content in relation to the surface area of the sand aggregate showed a most remarkable uniformity when tested in this rather crude way.

Texture of Mortars.—A careful microscopic examination of the cement matrix of the mortars containing test sands proportion as indicated showed in all cases an equal uniformity of distribution. In a comparison of mortars containing a less proportion of cement in relation to the surface area of the aggregate this condition was found to be equally true.

Effect of Excess Water.—The proper function of the water content of a mortar mix is to combine with the cement in producing the pasty matrix which, when set, binds the particles to the aggregate into a uniformly strong, stone-like material. The addition of a comparatively small quantity of water in excess of that required for the fulfilment of its proper function produces a very marked effect upon the structure of the cement matrix.

This change in the structure of the cement matrix can be readily seen by the aid of a microscope, but, like sunlight, it is far easier seen than described.

PRACTICAL APPLICATION OF THE METHOD.

The adaptation of the surface-area method of proportioning mortars and concretes to both laboratory investigations and to field construction operations presents no serious difficulties. The outstanding feature of this method, in so far as its practical application is concerned, is the importance of knowing the granulometric composition of the aggregates. It must be admitted that the securing of this all-important information involves a comparatively small amount of labour, and by way of equipment the use of only the necessary scales, standard sieves and screens. The time element involved is comparatively negligible, since, as described more fully herein, the computation work of determining areas and quantities of cement can be largely reduced to the most simple mathematical operations by the use of tables and diagrams. For use in the laboratory and in the field, diagrams drawn to a large scale increase accuracy and reduce labour.

CONCLUSIONS.

From a careful consideration of the results obtained and of the phenomena observed in the tests described in this paper the following conclusions appear to be warranted:—

General.—(1) The claim that the surface-area method of proportioning the cement content of mortars and of concretes is essentially scientific and rational is proven by the uniformity of results obtained in comparative strength tests of mortars and concretes and by the phenomena observed in these tests.

(2) With a given uniform proportion of cement in relation to the surface areas involved, this method provides a definite and practical means of comparing the relative strength-producing qualities of aggregates of varying physical, chemical and mechanical properties.

(3) This method provides a means for a more thorough investigation of the functions of sand and stone aggregates and for a more complete development of the true values of all the component materials of mortars and concretes.

(4) Excess water in an over-saturated mortar or concrete mix exerts a decidedly weakening effect upon the cement matrix by producing a change in the physical structure of the matrix which tends to destroy the cohesion existing between the particles of cement and the adhesion existing between the cement and the aggregate.

(5) In a normal consistency mortar the relation of the area of the particles of the sand aggregate to the cement content of the mix determines the strength of the mortar, provided the strength of the sand material is greater than that of the cement matrix. A similar condition applies to concrete mixes not over-saturated.

Mortar.—(6) The strengths of mortars containing a given cement and sand, but varying for the different mixes in the proportions of these ingredients, are directly proportional to the relation existing between the cement content and the surface area of the aggregate. It follows therefore that, the strength of a mortar of given mix being known, the mix of a mortar having a desired strength can be predetermined for the same materials.

(7) The quantity of water required to produce "normal," uniform consistency mortars from a given cement combined in varying proportions with sands having the same origin but varying in their granulometric composition, is a function of the water required to reduce the cement to a "normal" paste and the surface area of the sand particles to be wetted.

(8) The increase of volume due to the mingling of varying quantities of cement particles with a uniform quantity of a given sand bears no apparent relation to and is evidently not dependent upon the void in the sand.

Concrete.—(9) The tests indicate a probable definite relation between the ultimate compressive strength of the mortar content and the ultimate compressive strength of the concrete when the test specimens of the former are produced from mortar of the same mix and consistency as that used in the concrete.

THE CITY OF BIRMINGHAM ARTERIAL ROADS IMPROVEMENT.*

By Henry E. Stilgoe, M.Inst.C.E.,
City Engineer, Birmingham.

[*Concluded from last week.*]

The proposal recently approved by the city council is that we shall fix 110 ft. as the minimum width for streets for something like a mile from the centre of the city, and 120 ft. as the minimum width onwards to the boundary, and that whenever rebuilding or new building takes place it should be set back to that line.

Before fixing these minimum widths for the main arterial roads of the city, very careful consideration was given to the subject in all its bearings. The question of tramcars, or other popular means of conveyance, the ever increasing requirements of traffic, the planning of the new primary and secondary arterial roads (which lead the traffic into the main channels and thus relieve the new estate streets of main through traffic), and the new ring roads, at various distances from the centre of the city, are all very important factors.

TRAMWAYS.

At the present time tramways are laid in practically every one of the arterial roads running towards the centre of the city; these tramways are fed by tramways in other streets; also by motor omnibuses. Whether tramways or motor omnibuses or some other form of cheap conveyance will be employed in the future we cannot say; it is, however, certain that there is nothing likely to be produced which will be cheaper, from the point of view of tractive effort, than a steel wheel on a steel rail. Assuming then that the tramway is to remain with us, it is of great importance that the present cost of maintenance of the track and the rolling stock shall be reduced. The average cost of repairs and reconstruction of the tramway tracks in the streets approaching the centre of the city amounts to about £650 per mile per annum; this works out at about 1s. 6d. per square yard of track surface per annum, which, if capitalised at twenty years' purchase, amounts to 30s. per square yard. It is estimated that about 75 per cent of this amount would be saved if the sleeper track construction were adopted, and this, together with the saving on the initial cost of construction, should be set against the cost of the extra width of land required to provide for the independent sleeper track. The very rigidity of a tramway as at present constructed in the carriageway is contributory to its own destruction and to that of the rolling stock. A street tramway, when forming part of the carriageway, must of necessity be rigidly laid, but when constructed on the same principle as a permanent railway—namely, on separate track on an elastic bed such as is furnished by steel rails laid on sleepers and ballast—the maintenance of the permanent way is reduced to a minimum and the life of the rolling stock is considerably increased; further, the cost of the original construction is much less.

There would also be a great gain in the matter of speed, as, the tramway being on a track separate from the carriageways, the ordinary vehicular traffic travelling along a road could not get into the way of the trams; the consequent increase of speed would be not only an advantage to the travelling public, but would mean more economical working of the tramway service. Another advantage would be the lessening of the noise, as nearly all the noise from tramcars ordinarily arises from "hammered" rail joints, due to the rigid construction of the track, whereas an independent track on sleepers would be more elastic.

A further advantage is that, if in the future it is decided to increase the gauge of the tramways from 3 ft. 6 in. to 4 ft. 8½ in., it can be done upon the separate sleeper track system with comparative ease and low cost upon the width provided in this scheme. Therefore, in considering the width of arterial streets, sufficient width for a separate track for the tramway should be provided. The only practicable position for this in a shopping or business street is in the centre; consequently it is necessary to provide a carriageway on either side.

The minimum width required for tramways on sleeper track is 27 ft. for the track and 24 ft. for each of the two carriageways, making together 75 ft. between the footpaths; the footpaths to be 17 ft. 6 in each, giving a total street width of 110 ft. The 27 ft. of tramway track provides the necessary standing room for passengers; the two footpaths should not be less than 17 ft. 6 in. each, to provide for pedestrian traffic and space for the laying of service mains.

In the portions of the arterial roads more remote from the centre of the city, where land is cheaper, a minimum width of 120 ft. is recommended; the extra 10 ft. provides for trees in the tramway track and on the footpaths; this additional width is the minimum to obtain the object in view.

The width of 120 ft. for a suburban arterial road and tramway route should be taken as the minimum, and not as the maximum. There is nothing to spare for anything but the barest form of ornamentation. Provision is made for a central tramway track of 33 ft. in width, a carriageway on either side, each 24 ft. in width, and a footpath 19 ft. 6 in. wide (with or without a grass margin and trees) between each carriageway and the forecourt.

The minimum width of 27 ft. for the track does not permit of the planting of a hedge or row of trees on either side. Where the hedge or trees are planted, 33 ft. is the minimum, and 42 ft. would be better; but if 120 ft. is the total width of the street, then the footpaths would be reduced to 15 ft. each, which is not sufficient in all cases.

The large double-deck cars in the city carry from fifty-two to sixty passengers. At the present time a single-deck tramcar is being experimented with in Birmingham. If the single-deck cars eventually take the place of the double-deck cars, a greater number of tramcars will be necessary to deal with the traffic. On the other hand, assuming that motor omnibuses or some such vehicles were to supersede tramcars, it is obvious that a greater number of vehicles would be required. The double-deck omnibuses carry about thirty-four, and the single-deck omnibuses about twenty-five passengers. There would appear to be a general tendency to build smaller omnibuses rather than larger, and this again means more vehicles. The point for consideration is the number of vehicles and the carrying capacity. If tramways are constructed as at present in Birmingham—as a part of the carriageway of the street—it is certain that the number of tramcars will increase, and therefore adequate space must be provided in the arterial streets for other vehicular traffic.

WIDTH OF FOOTWAYS.

Due provision must also be made as to width of footways. Many of the street accidents are due to people stepping into the carriageway when making way for others on a narrow footway. The majority of our footways are too narrow for pedestrians, to say nothing of the space requisite for the accommodation of mains thereunder. There will be a saving of money and convenience to the city in this scheme of wide roads by the facilities afforded for laying all service mains under the footpaths instead of under the carriageways as at present; the costly breaking up and restoration of paved roadways, with its dislocation of traffic and general inconvenience, will be obviated and expenditure on the maintenance of main roads very much lessened.

The Birmingham City Council has been engaged for the past few years in considering the subject of improved arterial roads, and although the mind has been gradually trained to think of streets of greatly increased width, this scheme involving so radical a change has not been put forward without a great amount of thought and preparation. Great credit is due to those who have accepted the principle and have boldly taken the steps which, upon mature consideration, they believe to be right. . . . It is the greatest and most complete scheme of arterial road improvement which has ever been placed before and adopted by any corporation in this country. It provides for the widening of 43 miles of radial main roads and the construction of 7 miles of new roads. These lengths are exclusive of the various ring and other connecting main roads.

* From paper presented at the annual meeting of the Institution of Municipal and County Engineers.

TOWN PLANNING INSTITUTE.

FORTHCOMING MEETINGS.

The following meetings of the Town Planning Institute are announced for the Session 1918-19:—

November 1st.—Discussion on housing schemes. Introduced by Percy B. Houfton.

December 6th.—Report of committee regarding proposed Traffic Board for London.

February 7th.—Discussion on the report of the Road Board on the proposed Western-avenue and North Circular road.

March 7th.—"Character": its application in town-planning schemes. By Frank M. Elgood, F.S.I., F.R.I.B.A.

April 4th.—Proposed amendments of the Housing Town Planning, &c., Act, 1909, and of the Regulations. By E. R. Abbott.

May 2nd.—Discussion on town planning topics.

Sewer Boots.—Mr. W. T. Jelfs, surveyor, Kingsclere, Hants, Rural District Council, asks for the name of a firm supplying long-legged leather boots suitable for sewerage and water work.

Belfast Municipal Undertakings. — The Belfast city accountant reports that during the financial year 1917-18 the tramways made a surplus profit (upon a revenue of £355,000) of £11,545; the gasworks showed a surplus (on a revenue of £484,000) of £27,185; and the electricity undertaking made a profit (upon a revenue of £152,737) of £13,385.

MOTORS AND MUNICIPAL WORK.

CONSETT'S GAS-DRIVEN WAGON.

Gas has replaced petrol as the motive power of a wagon used by the surveyor to the Consett, Durham, Urban District Council, Mr. F. Hargreaves, for house refuse collection. The vehicle in the first place consisted of a second-hand Halley petrol lorry, having a carrying capacity of 3 tons. The original body was removed and replaced by a covered tipping body suitable for house refuse removal, and the wagon was delivered ready for use in May, 1917, the total cost being £275, but after repeated applications to the Petrol Council Committee a licence for the use of petrol was refused. It was therefore decided to use gas as the driving power, and accordingly a gas bag having a capacity of 250 cub. ft. was fixed in a frame 10 ft. by 6 ft. fixed over the engine and driver's seat. The machine was completed and commenced running on July 1st, 1917, and has been working almost continuously since without trouble or difficulty. The gas bag can be filled in seven minutes from a 3-in. supply main laid down by the gas company. Six fillings per day of nine hours are necessary, and the wagon takes six loads per day to the tip, which is a little over a mile from the town. In Consett motor haulage for house refuse collection has proved very satisfactory, and it is considered likely that its use will be extended in the future. The use of gas as the motive power presents no difficulties whatever, and there is no desire to return to the use of petrol until the price is very considerably reduced.

Falkirk Town Council have decided to purchase a motor fire engine.

Southend Town Council, at its last meeting, agreed to the purchase of a two-ton tip wagon for £1,242.

Sheffield Health Committee recommend the Financial Committee to vote £2,200 for the purchase of two electric vehicles.

Willesden Urban District Council propose to make use of electric vehicles for dust collection, if the council can secure priority certificates from the Government Department.

Gillingham Town Council have instructed the borough surveyor, Mr. J. L. Redfern, to obtain information with respect to the price of an electric van for house refuse collection.

Westminster City Council have agreed to increase their contract with Leyland Motors (1914) for steam motor wagon maintenance from £55 per wagon per annum to £100 per annum, owing to higher wages and the increased price of material.

With reference to the difficulty experienced by local authorities in maintaining their transport services, the Director-General of National Salvage announces that he hopes shortly to be in a position to offer a number of 3-ton covered petrol lorries for sale or hire to local authorities. The lorries cannot be guaranteed, but it is expected that they will be serviceable.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter X, combinations such as X.Y.Z., and words such as "*engineer*" and "*surveyor,*" should never be used.*

Caravan Dwellings: Sanitary Arrangements and Water Supply.—"W. F. Y. M." writes: Owing to the war causing excess population in this rural district, cottages are fully occupied, and several caravan dwellings on wheels have been erected, made up of an old lorry. The body of the dwelling is timber framing covered with ½-in. boarding and covered again with roofing felt; the interior is divided into two rooms, sleeping and living. There is no water supply provided and no drainage or closet accommodation. As the occupiers are away all day it is difficult to gain access to make inspection, but from a rough estimate one would say the area equalled from 800 ft. to 900 ft. Have the council any authority to compel proper sanitary arrangements and water supply? The difficulty is that the owner of the van is not the occupier, but charges a rent of 8s. to 10s. a week, and the vans are situated on common land owned by the parish. Assuming that notice can be served for sanitary improvements, should it be served on the owner or occupier?

I think there can be no doubt that these dwellings are "houses" within the meaning of the Public Health Act, 1875, and "dwelling-houses" within the meaning of the Public Health (Water) Act, 1878. See *Wright* v. *Ingle* (50 J.P., 436). In my opinion, therefore, the council can compel them to be drained, under sec. 23 of the Act of 1875, and to be provided with closet accommodation and ashpits, under sec. 36 of that Act. The notices can be served either on the occupiers or on the owners. The council can also compel the owners to provide a water supply, either under sec. 62 of that Act or under the Act of 1878. The notices for this purpose must be served on the owners. All notices may be addressed and served in the manner authorised by sec. 267 of the Act of 1875.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

COB BUILDING.

To the Editor of The Surveyor.

Sir,—I was pleased to see in your last week's issue the reply by "Building Inspector" to my letter of the 18th inst.

Now to condemn any class of material by results of bad construction is like condemning a particular school of thought by the inconsistent actions of its professors. I freely admit that some cob cottages are exceedingly bad, but where the essential rules are carried out—viz., carrying the stone or brick foundations well above the ground line; carrying up the walls in even courses of not more than 4 in. in height, well trodden down and given time to settle; providing wide, projecting eaves with a good outside coating of cement and plaster rendering; and doing the work in the early part of the summer, or, as the old Devonshire proverb has it, "When birds build their nests start cob building"—I do not see why they should harbour vermin.

This is a question that deserves consideration in the approaching work of reconstruction. In certain localities brick and stone are difficult to obtain, and cob building, in my opinion, if once tried and carried out in a proper manner would become a revived art. Cob houses are both cool in summer and warm in winter; there are practically no cracks or crevices if properly built, and, in my opinion, it would lead to cheap, roomy and comfortable cottages being erected in rural districts.

Personally, under proper and sanitary conditions, I see in it nothing contrary to the Local Government Board Model By-laws (Rural Series).—Yours, &c.,

Walter H. Whitaker.

Public Offices, Cheriton, Kent.
October 29, 1918.

HOUSING NOW AND AFTER THE WAR.

THE GOVERNMENT GRANT.

In the House of Commons on Monday, the President of the Local Government Board was asked whether, in the terms of the board's Circular of March 18th last in reference to the housing of the working classes, the words "the produce of a rate of a 1d. in the £," were intended to mean that, with a rateable value of £240,000, the total deficit on a scheme should not exceed £4,000, 25 per cent of that sum being £1,000, the produce of a rate of 1d. in the £, or whether the words were intended to mean that the total deficit must not exceed a sum the interest on which alone in perpetuity must not exceed the produce of a rate of 1d. in the £? Mr. Walsh, who replied, said the board's Circular did not limit the total amount of the deficit in the way suggested in the question. The board reserved a discretionary power to increase the grant beyond the 75 per cent of the deficit subject to the condition that the amount of the deficit borne by the local authority should not fall below the produce of a rate of 1d. in the £.

COUNTY COUNCIL ACTION IN EAST SUSSEX.

The Housing and Town-Planning Committee of the East Sussex County Council propose to draft a scheme for the county, which, while leaving to each district council complete freedom in the exercise of its powers and responsibilities, would by means of joint action between the authorities facilitate the raising of loans and the purchase of materials at the lowest possible price, while at the same time obtaining priority in the supply of Government material and labour. The scheme will be submitted to the various councils, but it cannot be proceeded with even in outline until information as to the probable housing needs after the war in every part of the county has been supplied.

IRELAND AND THE NEW BILL.

The president of the Local Government Board, asked in the House of Commons if he would state the reasons why the Housing of the Working Classes Bill was not to extend to Ireland, said the measure was designed to give certain powers to county councils in England and Wales. He had not understood that its provisions were required for application to Ireland, but if the Irish Government considered that the Bill could be usefully applied to Ireland, the matter could be dealt with by an Amendment in Committee.

Huntingdon Rural District Council have appointed a committee to prepare a housing scheme.

St. Austell Urban District Council have made an offer of £500 for 3½ acres of land for a housing scheme.

Rochdale Town Council has agreed to purchase land at Pitts Farm and Longfield Farm for housing purposes.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Ossett T.C.—The borough surveyor, Mr. H. Holmes, has been instructed to prepare a scheme for erecting a building for a national kitchen on the vacant land behind the town hall.

REFUSE COLLECTION AND DISPOSAL.

Arnold U.D.C.—Experiments have been made by the surveyor (Mr. R. E. Clarke), who is also local fuel overseer, with sifted cinders from dustbins. These were found quite satisfactory, used with coal, for the Free Library. It has been decided to supply quantities for use at the five council schools in Arnold.

Cleethorpes U.D.C.—The council approved a recommendation of the Destructor Works Sub-Committee, that all the salvage material should be abstracted from the household refuse by men appointed for the purpose, that the present arrangement of paying the men part of the salvage money be discontinued, and that the whole of the money be received by the council.

ROADS AND MATERIALS.

Boston R.D.C.—The council have resolved to pay the cartage contractors an increase of 1s. per ton, owing to the fact that no carting was possible from April 1st to the middle of July by the non-delivery of materials, the bulk of the work having therefore to be done during the winter.

Darlington R.D.C.—The council propose to carry out a widening scheme in Brusselton-road after the war.

Dungannon R.D.C.—The county surveyor (Mr. J. W. Leebody, B.E.), submitted a most encouraging report on the direct labour scheme in connection with the roads in the rural district. The scheme came into operation on April 1st last, and was being carried out in the six sections into which the district had been divided. Sufficient labour had been obtained, and a fair share of horse-work had been offered.

Egham U.D.C.—The surveyor, Mr. W. Menzies, stated that he had been officially informed that the Board of Trade Timber Supply Department had issued a requisition for the repair of Christchurch, Blacknest, and Middle Hill roads, which had been damaged by timber hauling.

Forfarshire C.C.—The Forfar District Committee have appointed a committee to consider a proposal by the Board of Trade Timber Supply Department to lay down a light railway from Glenprosen to Cortachy for the removal of timber. It was stated that there would be 17,000 tons of traffic to pass over the road.

Grimsby R.D.C.—In reply to a letter from the Road Board, the clerk was instructed to state that the council would be willing to supply labour and carting for the repair of certain roads in the Laceby and Irby districts, if the board would supply sufficient granite. The work is rendered necessary on account of the large amount of timber haulage expected in the near future.

Herne Bay U.D.C.—It was reported that the necessary land had been given for the purpose of carrying out a proposed improvement between Mount Pleasant and Thundersland-road.

Kidderminster T.C.—The town council resolved to purchase sites in Coventry-street, Leswell-lane, and George-street, for £445, for street improvements, and it was also agreed to accept the conveyance of a plot of land at the corner of Lion-street and George-street for the same purpose.

Lindsey C.C.—It was reported that the Highways Committee had under consideration a plan and estimate for strengthening the Friskney and Wainfleet main road, at an estimated cost of £12,000.

Maidstone R.D.C.—The council have agreed to increase the wages of the four road foremen by 4s. to £2 per week, and also to increase the bicycle allowance from £2 to £2 10s. a year.

Stamford T.C.—The town council have accepted an offer of £200 by the Road Board as a contribution towards the repair of New-road and Water-street.

Winchcombe R.D.C.—The acting surveyor, Mr. C. Gardner, reported that he had been in communication with the Road Board with respect to the repair of roads damaged by timber haulage, and the council consented to an application being made for the employment of German prisoners to carry out the work.

SEWERAGE AND SEWAGE DISPOSAL.

Hinckley U.D.C.—It was reported that the Michaelmas sale of the crops on the sewage farm had resulted in a return of £654, an increase over last year's amount of £234.

Slough U.D.C.—With respect to a complaint about emptying cesspools in the daytime, the surveyor, Mr. W. W. Cooper, stated that the staff at his disposal would not allow him to do the work at night.

WATER, GAS, AND ELECTRICITY.

Beccles T.C.—The question of an electric lighting scheme will be raised at the next meeting of the Public Lighting Committee.

Dublin T.C.—As a sequel to the non-fulfilment of the contract, entered into several years ago, for the construction of a new reservoir at Roundwood, the city council have come to terms with the contractors by which they (the corporation) obtain a cash payment of £10,514, the right to retain £6,803 which would otherwise have to be paid or allowed to the company on final settlement, and the plant, valued at £7,486, a total of £24,803. The agreement includes a clause for the payment by the corporation of 10 per cent on the value of the work done, and other moneys. It was stated that it would now be necessary to apply to the Local Government Board for sanction to a supplemental loan of £60,000 to complete the works.

Lurgan U.D.C.—The council have resolved to instal an electric lighting plant at the waterworks, Castor's Bay, Lough Neagh.

Manchester T.C.—The city council on Wednesday last approved of the scheme for acquiring Lake Howeswater, Westmorland, at a cost of £8,000,000 sterling, for the extension of the water supply. The scheme provides for a masonry dam across the north end of the lake, and the level of the lake, already 160 ft., above Thirlmere, would be further raised, and its length increased from $2\frac{1}{2}$ to $4\frac{1}{4}$ miles. It is estimated that this would provide an additional 70,000,000 to 80,000,000 gallons a day, and that the scheme would satisfy the requirements of the city for a generation.

Morecambe T.C.—The town council have decided to abandon their projected water scheme, estimated to cost between £100,000 and £150,000. It was stated that the Morecambe opposition to the Lancaster Water Bill would now be withdrawn.

Newport (Mon.) T.C.—In a letter to the town council respecting the water supply for the Taf Fechan reservoir, the clerk to the Merthyr Corporation states that Newport could be supplied by Merthyr with not less than 4,000,000 gallons per day in perpetuity. At comparatively little expense two additional drainage areas could be included, thus allowing a supply to Newport of 6,000,000 gallons per day in the future.

Plymouth T.C.—The engineer has received instructions to take steps for raising the dam at Burrator reservoir by 1 ft., at an estimated cost of £200. This temporary measure is expected to give an additional storage of 30,000,000 gallons of water.

Stirling T.C.—The town council are applying to the Secretary for Scotland for sanction to a loan of £4,000 for the purpose of installing condensing plant at the electricity supply station.

MISCELLANEOUS.

Paignton U.D.C.—The purchase has been completed for £1,200 of a site for the extension of the cemetery.

Rhyl U.D.C.—The surveyor, Mr. A. A. Goodall, reported further damage to the promenade sea-wall at the western end of the district by storms, and added that parts of the beach are at least 8 ft. lower than they were a few years ago. He was proceeding with the work necessary for the protection of the sea defences as far as possible, including the erection of a straight wall across the embayment which has been washed away. His advice to the council as to the other work urgently required was to cut off the nose of the gravel on the Denbighshire side of the river; put down groynes in the place of those washed away; and repair and extend the stone-pitched aprons. During this month there are four tides which will be over 21 ft. in height, and should a gale be blowing at the time of these tides further damage is expected. It was stated that the owner of the Butterton-road estate had given his sanction to the straight wall being built across the embayment, which the council are under an obligation to maintain.

Local Authorities and National Salvage.—Referring in their annual report to the formation of a special local authorities section in connection with the work of the National Salvage Council, the Local Government Board say: "It is undoubted that there is room for great progress in this matter, and that local authorities, by taking proper measures, will not only be serving pressing national needs at the present time, but may also gain financially."

PERSONAL.

Private D. Severns, a labourer in the employment of the Stepney Borough Council, and now a gunner on active service, has been awarded the Military Medal for conspicuous gallantry.

Mr. F. F. Gartside, clerk and surveyor to the Crompton Urban District Council, has had his salary increased by £30 to £300 a year.

Mr. Percy A. Watford, surveyor to the Claypole Rural District Council, has been gazetted a Second-Lieutenant in the Royal Tanks Corps.

Mr. W. H. Batten and Mr. T. H. Harris, surveyors to the Tavistock Rural District Council, who have each previously received a war bonus of £10, have now been voted an additional bonus of £25 each.

Sir George Gibb, chairman of the Road Board, has retired from the Committee on Production owing to pressure of work in his own department, and Sir Cyril Jackson, K.B.E., has been appointed chairman of the committee.

Lieutenant-Colonel E. Martin, borough engineer of Salford, has been decorated with the Chevalier's Cross of the Legion of Honour by the French Government. Mr. Martin, who has seen three years' active service, was awarded the D.S.O. in December last.

The President of the French Republic has conferred the Legion of Honour (Croix-de-Chevalier) on Lieutenant-Colonel A. Ernest Prescott, D.S.O., R.E. (borough engineer of Eastbourne) for distinguished services rendered during the course of the campaign in France.

Mr. O. M. Ramsay, burgh surveyor *pro tem.* of Carnoustie, has just received a belated war honour. This consists of the medal and clasp for the Basutoland Campaign of 1880-81, in which Mr. Ramsay took part as a member of Prince Alfred's Guards, a volunteer regiment of infantry raised in Port Elizabeth.

The friends of Mr. Geo. Peel Harvey, M.R.S.I., F.I.SAN.E., of Copenhagen, will be interested to learn that he has just been elected a member of the Danish Institution of Civil Engineers —a very exclusive body—and also a member of the Royal Geological Society, Stockholm. Mr. Geo. Peel Harvey read last year a very excellent paper on Modern Methods of Water Purification before the Danish Institution of Civil Engineers.

OBITUARY.

Mr. Malcolm Heddle, road surveyor to the Mainland District Committee of the County of Orkney, died recently, we regret to state. The vacancy has been filled temporarily by the appointment of Mr. Duncan Ross.

BUILDING BY-LAWS.

GOVERNMENT COMMITTEE'S REPORT.

In the report of the Local Government Board for 1917-18, issued this week, reference is made to the Committee on Building By-Laws which was appointed in 1914 by the then president of the board to consider the control at present exercised in England and Wales over the erection of buildings and the construction of streets by means of by-laws and local regulations and their effect upon building and development. The sittings of the committee were suspended on the outbreak of war, but resumed in November last under the chairmanship of Mr. Stephen Walsh, M.P., the Parliamentary Secretary to the Board. The taking of evidence had now been concluded, and it was hoped that the committee's report would be issued at an early date.

INSTITUTION OF WATER ENGINEERS.

WINTER GENERAL MEETING.

The winter general meeting of the Institution of Water Engineers will be held at Burlington House, London, on Friday, December 13th, commencing at 2.15 p.m. At this meeting the election of president and council for the year 1919-1920, and of auditors for the year 1919, will take place, and the following papers will be read and discussed, viz..—

"The Relation of Rainfall to Configuration," by Carle Salter, joint director of the British Rainfall Organisation.

"Stream Flow and Run-off," by Samuel Hall (Belfast).

"The Freezing of a Reservoir Outlet Works," by Gilbert Christie (Irvine and District Water Board).

An informal dinner will be held in the evening.

Road Construction and Maintenance in Johannesburg.—During the twelve months covered by the last issued report of Mr. G. S. Burt Andrews, M.INST.C.E., M.I.MECH.E., the town engineer, 8¼ miles of roads were constructed in Johannesburg, nearly 16 miles were remetalled, 156,447 sq. yds. were formed, and 1,046,872 sq. yds. were tarred.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is the long-delayed question of the superannuation of municipal officers at last to be taken up seriously by the Local Government Board, after having received scanty consideration in the past at the hands of the permanent officials of that authority? Are we not delighted to see that a committee has been appointed by Mr. Hayes Fisher to inquire and report on the subject; but would not municipal engineers and surveyors have been better pleased if they could have had direct representation on the committee? However, is it not a step in the right direction, and may we not hope that the claims of the overworked and often underpaid surveyor will not be overlooked?

* * * *

Was not the article entitled "Two Sludge Problems," by Mr. Arthur T. Martin, in The Surveyor of October 25th, very well worth reading by everyone who is investigating the question of the activated sludge treatment of sewage? Has there not often been an apparent endeavour by writers on this subject rather to camouflage the details, and does not Mr. Martin throw considerable light on the subject and make some suggestions which should be very helpful to those of us who are engaged in studying the vagaries of sewage and more especially the sludge resulting from every known method of sewage treatment?

* * * *

Does not one sometimes wonder what is to happen to many of the young surveyors and engineers of from, say, twenty-one to twenty-five years of age who have spent these last four years overseas in fighting for their country instead of studying for their diplomas? Will they have to start off again after the war, or will concessions be granted them? Though the war has been as rough on some other professions as that of engineering, does it not seem to be rather hard lines on these young men, and is it not to be hoped that some way out will be formulated?

* * * *

Why is it that at a recent conference of local authorities convened by the Road Transport Board it was found impossible to assist the board in their endeavour to form a scheme for co-ordinating the deliveries of goods by tradesmen to their customers? Is it not evident that if vehicles could be pooled a large amount of useless and unproductive cartage could be avoided, and another great waste could be stopped, and a "salvage" effected? What will future generations think of our present terrible waste of time, energy, and materials?

* * * *

Is it not evident that until existing roads which have been allowed to deteriorate so seriously during the war are put into decent order, capable of bearing the increased traffic which they will assuredly have to bear in the near future, it would be very unwise to contemplate the carrying out of the great arterial road schemes which are being promulgated all over the country? Does not the recent annual report of the Road Board hint at this in the statement that "until the more pressing and important needs of road crust improvements throughout the country have been met, the board will not be able out of the funds at their disposal to grant any substantial sums to schemes like the Western scheme?" And is not this a very wise decision?

FOR OTHER ADVERTISEMENTS
See End of Paper.

BOROUGH OF PEMBROKE.

The Town Council of the above Borough invite applications for the post of Borough Engineer and Surveyor to the Council.

The appointment will be a temporary one during the period of the war, or during the absence of the present Surveyor.

The gentleman appointed must be ineligible for Military Service, and will be required to perform the usual duties and, in addition, those of Water Engineer and Acting Sanitary Inspector.

He will also be called upon to act as the Architect to the Education Committee.

Inclusive salary, £150 per annum.

Applicants will be required to reside in the Borough and must be able to ride a motor cycle. No private practice will be allowed.

Applications, stating age, experience, and date when duties could be taken up, together with copies of three recent testimonials, must be sent to me on or before the 4th November next.

R. D. LOWLESS,
Town Clerk.

Pembroke.
October 15, 1918. (3,896)

BRITISH WATERWORKS ASSOCIATION.

ITS ORIGIN AND OBJECTS: AN AMENDED CONSTITUTION.

At the annual general meeting of the Municipal Waterworks Association held at Birmingham on October 4th, it was unanimously resolved to amend the constitution so as to admit to membership all municipal and local government authorities who possess water undertakings and all water companies, and the title of the association was accordingly altered to "British Waterworks Association." Previously membership was confined to municipal water authorities serving populations of 20,000 and upwards, but it is considered that the time has now arrived when the association should be extended so as to embrace all water undertakings.

The association was inaugurated in 1912 under the presidency of the chairman of the Metropolitan Water Board on the lines of similar organisations which had been formed in connection with other public utility services—namely, as a means of affording an opportunity of conference and co-operation in regard to matters of common interest. The chief objects of the association are to bring together representatives of water authorities for the purpose of considering and discussing important questions affecting their general interests and for facilitating the acquisition by conference, inquiry, research, and experiment or otherwise, of engineering, financial, legal and Parliamentary, statistical, scientific, and other knowledge of information relating to waterworks, and to diffuse this among its members. The association has been very successful. Its activities during the war in regard to man-power questions, priority of supplies, extension of powers, revision of charges, and other matters have been most fruitful, and advantages have been secured which have equally benefited water companies.

The association publishes a quarterly circular containing digests of legal cases, Parliamentary intelligence, a bibliography of all current printed matter affecting water supply, and a large body of statistical and general information which has proved to be of the greatest value to the members. Indeed, one reason why the association has adopted its recent reconstruction is because a number of water authorities, hitherto excluded from membership, became subscribers for the sole purpose of securing the association's publications.

The subscription for authority membership is fixed at £3 3s. per annum, which covers three representatives, one of whom must be the chief engineer, manager, or other chief officer of the authority directly engaged in and responsible for the management of the water undertaking. The committee also provides for individual members—namely, for responsible officers of water undertakings of authorities which are members of the association and their principal assistants. The annual subscription for individual members is £1 1s.

Mr. G. P. Warner Terry, Metropolitan Water Board Offices, South-place, Finsbury, London, E.C. 2, is the secretary of the association.

MINISTRY OF HEALTH.

ROYAL SANITARY INSTITUTE RESOLUTION.

For more than forty years since the Public Health Act of 1876 came into operation the Royal Sanitary Institute has been co-operating with the Public Health Service of the country, and has noted the steady progress made in methods and organisation, both official and voluntary, for improving the health of the people.

At a recent meeting of the council the progress made with regard to the Bill for the establishment of a Ministry of Health was under consideration, and the following resolution was passed:—

"The health of the people being of paramount importance in the progress of the nation, the council of the Royal Sanitary Institute have noted with great satisfaction the progress that has been made and the valuable work accomplished during the past fifty years by the various departments dealing with public health. The rapid development under present conditions of the many subsidiary factors affecting the question, and the complexity of the interests involved make it essential, for the effective continuance and development of the work, that so far as possible all matters relating to public health should be co-ordinated in one department as a Ministry of Health. The council therefore desire to urge that the matter is one of pressing public importance, and trust that it may receive the early attention of his Majesty's Government."

Institution of Civil Engineers.—Sir John A. F. Aspinall, the president, will deliver an inaugural address at the opening meeting of the 100th session on Tuesday next, the 5th inst. The chair will be taken at 5.30 p.m.

Society of Engineers.—On Monday next, at 5.30 p.m., a special lecture on "Obstacles to Post-war Trade" will be delivered by Sir Richard Cooper, Bart., M.P., in the apartments of the Geological Society, Burlington House, Piccadilly, W.

Popular Wood Paving.—Whilst a road in Kilburn, North London, was under repair some thousands of people gathered, and, in spite of police and other official warning, new and old wood paving-blocks of the value of £150 were carried away. When three people were charged at Willesden with having stolen the wood, the magistrate said there was certainly an impression in Kilburn that the blocks could be taken away. "I myself saw," he said, "a procession of people with prams, sacks, boxes on wheels and other receptacles." A witness said he saw "one gentleman digging up the road with a pick-axe."

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

BOROUGH ENGINEER AND SURVEYOR.—November 4th.—Pembroke Town Council. £150 a year.—Mr. R. D. Lowless, town clerk, Town Hall, Pembroke.

DEPUTY SURVEYOR.—November 6th.—Aldershot Urban District Council. £150-£200.—Mr. D. Llewellyn Griffiths, clerk, Municipal Buildings, Aldershot.

INSPECTOR OF NUISANCES AND HIGHWAY SURVEYOR.—November 8th.—Dolgelley Rural District Council. £150 a year.—Mr. R. Foulkes Jones, clerk, Bank Chambers, Llwyngwril, S.O., Merioneth.

WATERWORKS FITTER AND TURNCOCK.—November 11th.—Tunbridge Wells Town Council.—Mr. W. H. Maxwell, borough engineer and surveyor, Town Hall, Tunbridge Wells.

ASSISTANT ENGINEERING FITTER.—November 11th.—Gosport and Alverstone Urban District Council.—The Surveyor, Council Offices, Gosport.

SURVEYOR'S ASSISTANT.—November 11th.—Gosport and Alverstone Urban District Council. £3 3s. per week.—Mr. H. Frost, surveyor, Council Offices, Gosport.

ARCHITECTURAL ASSISTANT.—November 11th.—Grays Urban District Council. £200 to £250 a year, according to qualifications.—Mr. Arthur C. James, surveyor, District Council Offices, Grays, Essex.

SURVEYOR AND INSPECTOR.—November 12th.—Bulkington Urban and Nuneaton Rural District Councils. £200 a year.—Mr. C. Blakeway, clerk, Rural Council Offices, Nuneaton.

MOTOR ROLLER DRIVER.—Soke of Peterborough County Council.—Mr. Harry Russell, county surveyor, 45 Priestgate, Peterborough.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

BENTLEY.—November 6th.—For the erection of a national kitchen.—Mr. R. G. Whitley, Council Offices, Bentley, Doncaster.

BEDFORD.—November 13th.—For the erection of buildings and reinforced concrete coal bunkers.—The Engineer, Electricity Works, Cauldwell-road, Bedford.

Engineering: Iron and Steel.

BEDFORD.—November 13th.—For the supply and erection of two water-tube boilers, mechanical stokers and induced draught plant.—The Engineer, Electricity Works, Cauldwell-road, Bedford.

MANCHESTER.—November 14th.—For alterations and additions to the coal and coke handling plant.—Mr. F. A. Price, superintendent, Gas Department, Town Hall, Manchester.

Sanitary.

AUCKLAND.—November 4th.—For providing and laying about 160 yds. of 9-in. glazed earthenware sewer and manholes.—Mr. J. T. Robson, sanitary surveyor, 9 Cradock-place, Bishop Auckland.

JOHANNESBURG.—January 8th.—For the supply of 5,000 sanitary pails with eyelet holes and lids for the same.—Department of Overseas Trade (Development and Intelligence), 75 Basinghall-street, E.C. 2.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

NOVEMBER.

1.—Town Planning Institute: Mr. Percy B. Houfton on "Housing Schemes." 92 Victoria-street, S.W. 6 p.m.
5.—Institution of Civil Engineers: Sir John A. F. Aspinall delivers his inaugural address. 5.30 p.m.
7.—Institution of Municipal and County Engineers: South Wales District Meeting at Cardiff.
8.—Institution of Municipal and County Engineers: Metropolitan District Meeting, 92 Victoria-street, S.W. 5 p.m.
11.—Surveyors' Institution: Mr. J. H. Oakley delivers his presidential address. 5 p.m.

DECEMBER.

13.—Institution of Water Engineers: Winter General Meeting, Burlington House, London. 2.15 p.m.

APPOINTMENTS OPEN.

GOSPORT AND ALVERSTOKE URBAN DISTRICT COUNCIL.—Assistant Engineering Fitter in Charge required at the Air-Compressing Station, Westfield, Gosport. —Applications (on forms to be supplied), with other information, to be delivered at the Office of the Surveyor, Urban District Council, Gosport, not later than noon, November 11. (3,894)

GOSPORT AND ALVERSTOKE URBAN DISTRICT COUNCIL. Engineer and Surveyor's Department.—The Council invite applications for the position of Surveyor's Assistant. Salary, three guineas per week. Applicants must be experienced levellers and draughtsmen.—Applications, with not more than three recent testimonials, to be sent to the undersigned not later than November 11th.

H. FROST,
Surveyor to the Council.

Gosport.
October 17, 1918. (3,895)

GRAYS URBAN DISTRICT COUNCIL.
Applications are invited for the post of Architectural Assistant to the Surveyor.

Candidates must have received a proper Architectural training, be competent Surveyors and levellers, and have had experience in the design and construction of workmen's dwellings and in the lay-out of housing estates on modern lines.

The salary offered is from £200 to £250 per annum, according to qualifications.

Further particulars of the duties, &c., may be obtained from the undersigned, to whom applications, accompanied by copies of three recent testimonials, should be sent by 9 a.m., on Monday, November 11th, 1918.

ARTHUR C. JAMES.
Surveyor to the Council.

District Council Offices, Grays.
October 28, 1918. (3,904)

BULKINGTON URBAN AND NUNEATON RURAL COUNCILS.

The above Councils invite applications from Candidates for the offices of Surveyor and Inspector for the above two Districts.

Total salary £200 per annum—*i.e.*, Bulkington Surveyor, £40; Inspector, £35. Nuneaton Rural Surveyor, £60; Inspector, £65 and war bonus in addition.

The appointments as Inspector of Nuisances will be annual ones, and subject to confirmation by the Local Government Board.

The person appointed must be a competent Road Surveyor, and capable of keeping the books and accounts prescribed by the Local Government Board, devote his whole time to the above duties. Give guarantee bonds with an approved association in the sums of £100 and £100 respectively.

Must hold the certificates of the Sanitary Institute, or be prepared to obtain same within the time allowed by the Local Government Board.

Preference will be given to those who have seen active service in H.M. Forces.

Sealed applications in Candidate's own handwriting, stating age and present and previous occupations, and accompanied by copies of not more than three testimonials of recent date (which in no case will be returned), must be sent to me, on or before Tuesday, 12th November next, marked "Surveyor and Inspector."

Canvassing will disqualify.

By order,
C. BLAKEWAY,
Clerk.

Nuneaton.
October 23, 1918. (3,902)

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH
EXPANDED METAL.

EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet.
Mr. Samuel Hutton, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED
(Patentees and Manufacturers of Expanded Metal).
Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.
Works: STRANTON WORKS, WEST HARTLEPOOL.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. NOVEMBER 8, 1918. No. 1,399.

Minutes of Proceedings.

The State Housing Scheme.

In replying to a question which was asked in the House of Lords on Thursday of last week, Viscount Peel, as the official spokesman of the Local Government Board, gave some interesting particulars as to the present position of the Government housing scheme. From the statistics given it appears that the scheme is by no means so far advanced as is generally supposed. Thus, out of a total number of about 1,800 local authorities, only eighty-four have already put forward definite and complete building schemes; while 162 other proposals are before the board, and 350 local authorities who are acquiring land for the purpose of schemes are rapidly proceeding with their preparations. It will therefore be seen that definite proposals end with about two-thirds of the local authorities unaccounted for. It is true that we are further told that replies have been received "indicating a willingness" to provide nearly a quarter of a million houses. But many of these replies are known to be conditional. Indeed, it was frankly acknowledged by Viscount Peel that delays were being caused by certain local authorities trying to get better terms than the Government can sanction, by the many special duties cast on local authorities by the war and the depletion of their staffs; and by the fact that reports are awaited from the Commissioners appointed to deal with the question of building construction in connection with the erection of dwellings for the working classes, and with the supply of building materials. Viscount Peel replied at the same time to questions as to the part to be played by public utility societies and private enterprise in connection with housing after the war. In regard to the former, he stated that the Government would advance 75 per cent of the cost by way of loan for a term of fifty years, leaving the remaining 25 per cent to be provided by the societies themselves. No decision has yet been arrived at with regard to assisting other forms of private enterprise, pending the issue of the report of the Hobhouse Committee.

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Rural Council and Assistant Surveyor.

Value, as we know, is a relative quantity, but it becomes a positive factor in the minds of certain councillors when the work of officials is in question. This aspect of the matter found expression recently at the Forden, Montgomery, Rural District Council, when a member raised the question of the position of the assistant surveyor, Mr. Llewelyn Davis. There was, he asserted, a suspicion that the council were not getting value for their money, and the concrete example he quoted was that at a previous meeting there was a question of having someone with the roller to mark out where the stones should be put, and the council appointed a man other than the assistant surveyor to do the work. People, he said, wanted to know what Mr. Davis was doing, more especially as he had been appointed fuel overseer and sanitary inspector to the Montgomery Town Council. Mr. Davis accepted the challenge, and explained that his duties consisted in going round to see that the men gave a fair day's work. He had also to go over the various roads, see what repairs were required, write the quantities of stone available and required, keep records of the work of the tractor, and keep and check the men's time sheets. He covered the Montgomery and Cherbury districts as well as Forden. Mr. Hole, the surveyor, he added, said he had no cause of complaint. Asked what he was paid, Mr. Davis stated that he received 35s. per week, considerably less, we think, than road-sweepers are paid in many places, and certainly not in excess of what any ordinary roadman ought to receive in these times. It is only right to add that the council appointed a committee to prepare and lay before the council a statement of Mr. Davis's duties, and it is to be hoped that whatever else this body may propose they will consider it their duty to insist that the assistant surveyor shall receive a living wage for the work he is doing, for it is obvious that he is not receiving such recognition under present conditions.

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Motors and Road Construction.

In the last annual report of the Deputy Minister of Public Highways for Ontario, the question of the influence of motor vehicles upon road construction is dealt with at some length. In view of the probable release of an enormous number of motor lorries from France and Belgium for use in this country, the matter is one of immediate concern to British engineers. It is admitted on every hand that the future will witness a large increase in the use of highways by heavy motor vehicles, and that this will render it necessary to spend a large amount of money in strengthening roads which, although admirably suited to the old traffic conditions, are quite inadequate to bear the heavy burdens referred to. We have generally taken the view in regard to changing traffic conditions that the proper course is to adapt the roads to the traffic and not the traffic to the roads. In other words, it seems to us to be unwise, as a matter of policy, to attempt to avoid incurring expense in adapting the roads to new conditions by imposing restrictions on the construction of vehicles. This general principle, however, must of course be applied reasonably. For example, the owner of a lorry of quite abnormal weight could not expect all the roads to be strengthened for his individual benefit. This principle is the foundation of our law as to extraordinary traffic. But even in such a case the traffic is not in itself unlawful or prohibited; the law merely provides highway authorities with a means of recovering special expenses which it causes. When traffic becomes ordinary, however—and this will be the case with regard to heavy lorries in many districts within the next few years—the obligation is on the highway authority to provide roads strong enough to carry it.

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Roads in France.

In another column will be found an article of very great interest by Major Salkield, R.E., in the course of which he gives some account of his experiences in connection with military road work in France. Although Major Salkield has given up his work in France, and is about to resume his civil and military duties in India, it is of course in present circumstances impossible for him to say all that he would like to say, or all that would interest our readers with regard to his thrilling experiences. Engineers in this country, however, will view with satisfaction the record which he is able to give of the manner in which technical difficulties have been overcome. If any general lesson can be drawn from what Major Salkield has to say, it is that the modern road is essentially an arch, and that any weakness in the abutments will, if the structure is subjected to excessive strain, inevitably result in its virtual destruction. It is difficult for any one who has not visited the scene of action to realise the kind of service that has been rendered by the special Road Corps, nor its vital importance to the success of the actual fighting operations. In this connection extracts which Major Salkield gives from his diary are very illuminating, and we only regret that upon his return from leave the diary was not continued. We agree with him that when the war is over, and engineers who have been on service are able to speak more freely of their experiences, the information which they will be able to give will be of the greatest value, not only from a military point of view, but also in the ordinary work of civil highway construction.

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Housing Points.

At the last meeting of the Town-planning Institute the general subject of "Housing Schemes" was under discussion, being introduced in a paper by Mr. Percy B. Hough Houfton. It was only natural that upon such an occasion a good deal should have been said upon the questions of site

and lay-out. The reader of the paper expressed the opinion that the Government proposals for twelve houses to the acre in urban and eight in rural districts hardly went far enough. This may be so, but at the same time it must be admitted that they are a considerable advance on the general practice of the past. With regard to lay-out, Mr. Houfton reminded his hearers that the all-important question is that of roads, and that the time had come when, in deciding the width of a road, regard must be had to the number of lines of vehicles it would have to carry, instead of fixing it at an arbitrary number of feet. Dealing last of all with the planning of the house itself, Mr. Houfton made, in the first place, some caustic criticisms of the sets of plans that have been published by the Local Government Board. He then proceeded to discuss the question of municipal building *versus* private enterprise, and made the sound point that municipal housing schemes opened up possibilities of communal services of many kinds which are impracticable for speculators. This is an aspect of municipal building which is often lost sight of, largely because advantage has not hitherto been taken of the opportunities presented.

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The Future of Light Railways. There can be little doubt that the release of large quantities of rolling stock at the conclusion of hostilities will produce a great revival in the construction of light railways in this country. In Herefordshire, at all events, no time is being lost, for within three weeks of their appointment the Light Railways Committee have produced a comprehensive scheme for the county, and this has already been forwarded to the Board of Agriculture for approval. The scheme, which provides for the construction of 104 miles of track, has been prepared by Mr. G. H. Jack, the county surveyor, who, in the course of his report, pointed out that its execution would mean relieving the county roads of a large volume of heavy traffic which they are but ill-fitted to bear. Indeed, he went so far as to describe these roads (with the exception of about 20 miles of recent construction) as "narrow, sinuous and weak, and not at all suitable for a continuous service of heavy motor vehicles." If the new heavy traffic were placed upon these roads, the cost of reconstructing and widening them would very nearly approach the cost of the railways, while subsequent maintenance would be more expensive, and a less efficient service would be provided. It would be interesting to know what action is being taken in other counties in regard to this important matter, as to which Herefordshire seems to be a pioneer.

THE ENGINEER IN WAR.

MILITARY APPRECIATION OF TECHNICAL QUALIFICATIONS.

As was to be expected, railway engineering bulked largely in the address which Sir John A. F. Aspinall delivered last Tuesday evening on the occasion of his installation as president of the Institution of Civil Engineers. The share of the engineer in the struggle now happily drawing to a close was, however, not overlooked by Sir John. "We all have," he said, "in our recollection the large number of our members who have gone to the war, who are fighting for our homeland and those dear to them, and think with sympathy and regret of those 291 members who have made the great sacrifice."

The majority of the young men who formed the backbone of the institution would, Sir John observed, in due time come back to them to re-enter into the work of their profession in a civil capacity, and it was the duty of those who were left behind to see that when they did return every possible kind of help was given to them to make a fresh start, and assist them to forget the perils and privations they had gone through, also to afford those facilities which were necessary for them to maintain the engineering traditions of the Empire.

In the earlier days of the war the military authorities were quick to seek the advice and assistance of the institution in obtaining officers of proved professional training for the engineering units in France and other theatres of war; and it had been their privilege to feel that confidence in the merits of their system of selection left no doubt in their minds that the right men were selected in every case in which the institution was concerned. They also had reason to be proud of the engineering work which had been carried out by those who joined the Forces, confirming as it did the knowledge that professional training of an adequate kind was the only road to success.

The number of their members attached to the fighting Forces of the Empire since August, 1914, was on the last count 3,007. Their efficiency as soldiers was testified by 307 military orders and distinctions already gained by them. The recognition by the military authorities of their technical qualifications, largely influenced by their membership of the institution, was shown by the fact that 1,430 of them had been commissioned as officers of the Royal Engineers—a number which would have been largely exceeded had the demands of the War Office for technical officers been in earlier days sufficient to absorb all the young engineers who offered their services to their country.

Sir John went on to say that they could not speak so favourably of the action of the Civil Department of the Government, which had not always recognised the necessity for application to the heads of the engineering profession for men to deal with the emergencies which had arisen and to fill the very numerous posts connected with engineering construction at home; and it was not unreasonable to suppose that where works constructed under Government auspices had not been successful, better results would have been obtained had more attention been paid to the selection of men who were properly qualified to direct them.

He might perhaps be pardoned for reminding them of the important letter which was sent to the Prime Minister of the time by Dr. W. C. Unwin, when he was president in 1912, dealing with this most important subject of the fuller recognition of the advantages of professional engineering qualifications by Government Departments. This was a subject which must always be kept before them, and it was the more necessary that all their new members should feel that it was not only an honour to belong to the institution, but an advantage as well. A man who bore the hall-mark of membership had the right to feel that his qualifications entitled him to consideration and support when dealing with public work or with those in Government Departments who controlled it.

It was gratifying to know that there was a large and continuous stream of applicants to join the institution although we were at war, and this might be an indication of the fact that it was becoming more and more evident how much the world was dependent upon engineering effort, whether applied to the destructive agencies of war or to the arts of peace. On all sides they had seen that the work of mathematicians, chemists, physicists, metallurgists, and electricians had contributed to the successful prosecution of the war both by land and sea, and there seemed to be a general recognition of the fact that all engineers' work must be given credit for our rapid progress in defeating every hostile invention. It was, Sir John added, good evidence of the deepening interest taken in all matters with regard to the concentration of engineering effort that a number of the engineering and scientific societies which had not as yet got homes of their own were discussing the possibility of housing them all in one common building with common library facilities. It had been the institution's privilege in the past to offer these societies the hospitality of their lecture theatre for their meetings; but he was sorry that, though they would miss their friendly visits, their members would be only too happy to wish them success in their new venture if it matured, and express the hope that Westminster would become the centre of their efforts.

THE LIGHTING OF STREET REFUGES.

LITIGATION OVER A WESTMINSTER ACCIDENT.

In the case of "Baldock *v.* Westminster City Council," in which the plaintiff appealed against a judgment given in the Lambeth County Court, it was stated that the plaintiff's taxi-cab was being driven along Cockspur-street when the vehicle came into collision with the posts of a refuge where the light had gone out. Mr. Justice Lush, in allowing the appeal (in which Mr. Justice Bailhache agreed), said the question was whether there was any evidence which would justify the jury in saying that in the circumstances the public authority had not taken reasonable care in discharging their duty in lighting the refuge. The judge held that there was no evidence to justify the jury in taking that view. He said, however, in effect, that if the particular lamp on the particular refuge had gone out before, then it would have been competent for the jury to say that the defendants were negligent in not providing a substitute or alternative lighting. It did not seem vital to say whether this lamp had gone out previously. There was sufficient evidence that other lamps had gone out, and the defendants were aware that, owing to the pressure, the lamps had become irregular, and that there was a great risk at any moment of the lights ceasing. That being so, it was a mere question of fact or degree for the jury whether the lighting was reasonable, and it could not be said that there was no evidence to go to the jury that the lighting was insufficient and not reasonable.

Judgment was entered for the plaintiff.

Hastings National Kitchens.—Owing to losses on working the Hastings Town Council have decided to close two national kitchens and keep open the kitchen at West Hill.

Wanted.—Copies of The Surveyor of February 15th and March 8th last are urgently required. Will readers having spare copies of these issues kindly communicate with the Publisher, 24 Bride-lane, Fleet-street, E.C. 4?

Military Road Works in France.

By T. SALKIELD, M.INST.C.E., Major R.E.

The question has been asked more than once in the professional papers why the municipal engineers from the homeland who are serving in France have not, like some of their colonial brothers, contributed to the English journals an account of their stewardship such as have appeared in overseas publications.

As the author has finished his period of service in France, and is about to resume his civil and military duties in India, he feels privileged to write, and is pleased to place on record a few random notes which may be of interest to those who have been obliged to "Keep the home fires burning" while their friends have been seeing, doing and thinking many things, and winning honours for themselves, the profession to which they belong in particular, and for Britishers in general.

This article must of necessity be written in the historical past tense, as the various matters to be referred to are but memories—the record of an interesting, strenuous and somewhat dangerous epoch of the author's life. Events similar to those to be mentioned are still happening and could be written in the present tense if the men who are carrying on this important active service duty—the upkeep of war roads—had the time to write their experiences. What an interesting series of articles will be given to the world when peace is restored!

The early days of the war found the Army understaffed in its many and varied branches, and superhuman efforts had to be put forth by the men of the regular service. They tried to do what was ultimately found to be impossible because of the new conditions brought about by war on such a gigantic scale, and because of the paucity of officers trained as experts for the different branches of the service.

EARLY DIFFICULTIES.

It was some time before the great importance of roads was fully realised. The apparent simplicity of such undertakings was possibly responsible for this. We are told that water is never missed until the well runs dry. The roads of France, by efforts which must have been prodigious, were kept alive for a long time, but the moment of collapse came suddenly, and then the seriousness of the situation was realised.

History will record that at this juncture the subject was tackled with true British courage and determination. Road engineers enlisted, a directorate was formed, and experienced men were drawn from fighting units and volunteres from the ranks of the peaceful modern highwaymen were assembled. Soon the conditions began to improve, and it is good to know that those in high authority have been pleased to express their approval of all that has been done.

Most of the roads of France, which were suddenly called upon to carry the never-ending traffic of guns, transport, men, and the medley of things which form a modern army, had no foundation. Hence the position under peace conditions would have been impossible; but when it is remembered that the roads for many miles back from the trenches were frequently under heavy shell-fire, and that all road materials had to be quarried and brought from great distances at times when the capacity of the French railways was taxed to the uttermost, some idea of the magnitude of the task may be formed.

In the early days of the Road Directorate, before sufficient trained units were available, it was necessary to obtain unskilled labour from various sources, either by the formation of divisional works battalions or from resting line regiments. Naturally this was a fruitful source of complaint, as fighting men objected to the more peaceful pursuits of road making; but after a barrage of adjectives, directed at no one in particular, had fallen on interested ears, and an extempore lecture on the importance of roads had been given, the wonderful Tommy Atkins tackled the job.

It was hard work supervising and directing so many men and their officers who had no knowledge of road construction, but the experience gained under such conditions compensated for many anxious moments, and the author would like nothing better than to be able to thank every man for what he did during those trying early days. Many of these men have since then made the supreme sacrifice, but some of the survivors may read these lines. Later on trained units became available for road works, which made the task much easier.

It is impossible to classify war roads, for all roads which are maintained are of first-class military importance, but the conditions vary with geographical situations and all roads have not the same characteristics.

Roads outside the towns and villages have the usual grass or earth verges, and it was most difficult to prevent the cutting away of the road edges. This meant the rapid destruction of any road as soon as its skew-back had been destroyed, for a road, like an arch, cannot stand with insufficient or improperly constructed abutments. This trouble was, to a very great extent, reduced by putting in round timbers—pit-props—along the roads. At first these were placed close together, but experience proved that about five yards apart was a suitable interval. This, while protecting the edges of the roads, did not save the surface—probably it had just the opposite effect—and the demand for road metal was incessant. This material, of different kinds, quality and quantity, arrived at various railheads and in places it was water-borne. It was off-loaded often under most difficult conditions, owing to shell-fire or bad approaches, and because of the ever-increasing demands for the accommodation of trains of munitions and supplies. Wherever possible, special stone sidings were constructed. The material for the roads was then removed from the trucks or barges by lorries, and one was always "up against" the lorry requirements of others; but mutual assistance and tactful dealings solved many difficulties, and so far as the author's experiences are concerned, happy relations always existed between the Mechanical Transport officers and himself.

The war, of course, could not be won without "returns," and in the making of returns there was no end. This began with the recording of truck numbers and measurements, and ended with an elaborate statement showing how, when, and where each ton of stone had been hauled, and what had finally become of it. It is to be hoped that the many anxious midnight hours spent in making returns with regard to material and labour will be mentioned by the recording angel.

STEAM ROLLING AND TAR SPRAYING.

The steam road roller played its important part, and only those roads under direct observation of the enemy or which were subjected to intense shell-fire were left without the attention of this most useful machine which has done more for the comfort and well-being of man than has ever been recorded in its favour.

The importance of road rolling was so manifest that petrol rollers were used in places where the smoke of a steam roller might draw gun-fire. Nor did construction stop here. Clouds of dust raised by the passage of men and vehicles along roads indicated the fact to our enemies, and often resulted in a bout of shelling and also led to the rapid destruction of roads during dry weather. To overcome these defects, tar was used in great quantities, and machines for spreading this were provided. One length of road, which runs for many miles along an important canal, was widened and entirely reconstructed and tar-sprayed throughout—a real war-time triumph which should cause showers of blessings to descend upon us from those who will use this road in peace times.

A problem with which we were constantly confronted was the sunken road—a road dug out to flatten the gradients—with high banks on each side. This type of road was rarely if ever wind swept, and it was impossible to provide means of adequate drainage or elongated receptacles—generally known as ditches—into which mud could be scraped and swept, as was the case on other roads. The mud problem was ever present on all kinds of roads, and it was partly solved by digging at intervals along the roads and well back from them a series of large, deep holes into which mud was encouraged or compelled to flow. On sunken roads it was necessary to protect the banks by means of timber revetment—round timbers dug into the road to which slabs were spiked. Until this was done the heavy lorries, guns, caterpillar tractors and other vehicles were constantly shaving off slices of clayey earth from the banks and the wheels continuously depositing this on the road, causing the surface to be churned up into an indescribable mess—a soft, sticky conglomerate mixture of clay, marl, chalk and stones, enough to break the heart of any man, and cause even the bravest roadman to imagine that we must lose the war because of the state of the roads. But this very thought made everybody work with renewed energy at such times, and what often seemed more like a ploughed field than a road continued to pass traffic, and by dint of hard labour took on again the semblance of a road.

It was very noticeable how heavy-trafficked roads had a tendency to creep and move laterally, and the knowledge of this fact was often made use of and sides of roads exploited for stone when such material could not be otherwise procured. This answered a fourfold purpose—it meant economy of material, and enabled sides of roads to be lowered and the crowns raised, thus improving the camber and facilitating drainage.

Roads with steep gradients suffered very much in consequence of the high resistance to traction on all inclines. In such places the material composing the road-crust rapidly became pulverised.

Traffic routes, both single and double, were carefully worked

out according to the width or state of a road, and control posts were located at all important points. One of the very definite rules on busy roads near the Front made it necessary for all traffic to move along as closely as possible to the sides of the road. This, while an excellent arrangement for preventing traffic straggling about the roads, resulted in the rapid formation of ruts, and as vehicles followed each other in quick succession, the upkeep of roads under these conditions was not easy—in fact patch repairs were more difficult than reconstruction work.

Near destroyed villages and towns, in places where sections of roads had entirely gone, as so frequently happened after frost and heavy rain, and where very little hard stone was available it was found that a hand-packed foundation of bricks carefully laid on edge and then protected by a coat one stone thick of macadam gave very excellent results.

In parts of the forward areas—particularly in places where batteries of guns were located near the roads—it was impossible to work by day, owing to enemy shell-fire. In such cases it was necessary to have parties out at night for the repair of shell-holes. A very excellent system of bicycle patrols was developed for certain areas having a bad reputation; this proved very effective, and enabled repairs to be carried out with promptness and thus prevented traffic delays.

War does not tend to encourage habits of thrift, and borrowing without permission and with no intention of repaying becomes a fine art. When everything belongs to the State it is difficult to exercise that fine moral discrimination which one expects to find in civil life.

STONE HUNGER.

The stone hunger of all war roads was prodigious, and as rapidly as materials were received they were swallowed up. It was necessary to put a check on this extravagance, but most difficult to stop it. It was only after many lectures on the subject that it was possible to instil the idea of conservation of road material into the minds of the men. The following parable frequently repeated ultimately bore good fruit:—

"It is only the foolish who spend as rapidly as they receive and make no provision for a rainy day. The wise put a little of their substance aside either in a bank or other safe investment. Look upon the roadside bays you have cut in the bank as your bank, and the road material as your savings, or, better still, as your capital. Save—put some of it into the 'bank;' then when the demand comes you can draw on your reserves."

Fortunately, we started saving in good time, and so were able to carry on at a certain place when trains of stone failed to arrive and forward movements were necessary.

Of course there was the inevitable fly in the ointment, and we suffered from the depredations of those who argued with themselves that their claim to take stone so carefully "banked" at the roadside was a legitimate one, being Government property. Adjacent to many of the more important roads camps, gun-emplacements, dumps, water points, mechanical transport stands, horse and mule lines, &c., existed; and what could be more natural than that those in charge of these should cast coveteous eyes upon the stone for making approach roads to their own places which so often were seas of mud? Very strong action had to be taken before a stop was put to this practice.

On one occasion the author met the oft-repeated wishes of his friend the S.M.T.O.—a person it was wise to keep on good terms with, as he doled out the lorries—and allowed him to take quite a quantity of large stones. A time however came when this material was most urgently needed, and to show how very amiable mechanical transport officers are it is pleasing to state that he allowed the material to be taken up, though to his own inconvenience. May this meet the eye of my old friend the Colonel!

Fascines played a most important part in road construction and repair work and for putting over hastily filled up shell holes and craters which otherwise could not have passed the traffic. They were very useful for draining roads and the construction of roads in low-lying, water-logged areas. In one part we used fascines in conjunction with large quantities of sand; the fascines were pegged down, covered with sand, and broken material—macadam—a stone thick spread over the sand. This hasty form of road construction proved very useful, and was much better than the terrible "corduroy roads" made by spiking down round timbers to bearers and filling in the spaces with broken stone—a form of construction often resorted to in an emergency.

It was near one of these sand roads that the following conversation was overheard:—Scene: A mule line. A number of mules secured to a rope fixed between two trees. One mule busy pawing the sand and making quite a large hole. Corporal calls for the private responsible, and says, "That mule of yours is digging hisself in." Private addressed replies, vehemently: "Yes, by gum! He'd make a good ratter!" A typical bit of humour frequently met with in most unlikely quarters.

(To be concluded.)

TAR-MACADAM *v.* GRANITE MACADAM.

By Ellis W. Jones,
County Surveyor, East Denbighshire.*

In August, 1912, a mile of the Chester and Wrexham main road, through the village of Gresford, was resurfaced with granite tarred macadam, and has been annually tar-painted ever since; and from the time it was resurfaced up to date there has not been over 10 tons of tar topping used on this mile of road for filling in pot holes. Its condition is good at the present moment.

The road on either side of the tar-macadamised length since August, 1912, has been twice steam-rolled on the water-bound system, on each occasion the best granite macadam only being used. These lengths on either side of the tar-macadamised section have been annually tar-painted, but their condition is not by a long way equal to the tar-macadamised section. Further, the Chester main road from Flintshire boundary through the village of Rossett was tar-macadamised in 1914 and annually tar-painted. The condition of this section is good, and has been maintained with 10 tons to 12 tons of tar-topping per annum.

From nearly opposite the Turf Hotel to Crispin Lodge Mold-road was tar-macadamised in July, 1913, and annually tar-painted. The condition of the tar-macadamised length is very satisfactory, whereas that from the Turf Hotel to Wrexham borough boundary is full of pot holes, although steam-rolled last year. The road from Crispin Lodge towards Gwersyllt was steam-rolled this year on the water-bound system, granite macadam only being used and then tar-painted. It is at present in very good condition; nevertheless, pot holes are forming at several points.

From opposite Travellers' Inn, Johnstown, beyond Tan-y-clawdd farm, Ruabon-road was scarified and tar-macadamised in July, 1914, and has been tar-painted each year since. To-day this short length of road is in a proper state of repair, and the surface is perfectly free from pot holes, whereas the condition of the length from Tan-y-clawdd farm to Messrs. Monk & Newell's level crossing, which was steam-rolled on the water-bound system the same year and tar-painted each year since, is, I regret to report, most unsatisfactory. Again, the Ruabon road from New Inn, Johnstown, to Glan'rafon, Rhostyllen, was scarified and tar-macadamised in September, 1916 (the Brymbo "Tarmac" and the Ceiriog "Granomac" being used), and has been annually tar-painted. The entire length to-day is in a very good state of repair, taking into consideration the weight this important road has to carry. According to the census of traffic taken in July, 1914, the weight amounted to 12,199·21 tons per week. The road on either side has been twice steam-rolled on the water-bound system and annually tar-painted, but its condition is not to be compared with the tar-macadamised section.

From near the Waterloo Inn to Pont Felin Hen the London and Holyhead road (town of Llangollen), was scarified and tar-macadamised in July, 1914, and tar-painted each year since There has not been a ton of tar topping used in filling up pot holes since it was resurfaced, and the whole length is to-day in splendid condition, but the road from Pont Felin Hen towards Chirk, which was steam-rolled on the water-bound system in the same year and tar-painted each year, is not by a long way in equal state.

In every instance where tar-macadam has been used the result is highly satisfactory, and I strongly recommend that a larger area shall be every year, say, from 5 miles to 7 miles, until the chief trunk main roads are dealt with. Unless such a method is adopted the main roads in East Denbighshire, if maintained on the water-bound system, will not be able to carry the traffic, as in all probability when the transports are returned from overseas these main roads will be subjected to heavier traffic than ever before. In my opinion, roads that have to carry from 600 tons to 1,000 tons per day should be maintained with tar macadam.

The Tribunals.—At the Cornwall Appeal Tribunal, sitting at Bodmin, an application was made for a renewal of the exemption granted to J. F. Burford (44, G. 1), acting borough surveyor and inspector of nuisances for the borough of Launceston in the room of Mr. A. W. Grace, the borough surveyor, at present on road construction work for the military authorities on Salisbury Plain. The corporation, said Mr. Gill, who appeared for that authority, had advertised for a successor, but had not succeeded in finding one. Captain Tosswell said the town council of Launceston did not require much sympathy. They were saving the cost of one man. Mr. Gill remarked that that was scarcely a fair thing to say. The Launceston Town Council had asked for the return of Mr. Grace from military duties and had been refused. The tribunal considered that the work which Mr. Burford did was essential to the district, and they would give him temporary exemption for three months.

* Report to Main Roads Committee.

Motor Vehicles and their Influence upon Road Construction.

By W. A. MACLEAN, Deputy Minister of Public Highways for Ontario.*

The motor truck as a means of transportation has come into recent prominence through its use for war purposes, through its application to freight transfer between adjacent cities and towns and over routes from 50 to 150 miles in length. Indications are many that, coupled with roads of adequate strength, the motor truck will become an ever-increasing factor in this regard. Giving evidence before the Railway Commission of Canada in regard to freight rates, it was recently stated by railway officials that the influence of motor trucks on local freight adjacent to large cities is very great; that in certain cases railways now receive very little local freight within a radius of 50 miles from large cities having systems of good roads adjacent to them, as it is handled by motor truck.

Just as railways were compelled to use heavier rails and increased strength of road-bed to carry heavier trains and engines, so will it become necessary to build stronger highways to serve the traffic of heavy motor trucks, particularly on main lines between cities and radiating from large centres of population. The wear from comparatively light and rapid traffic of passenger vehicles is first apparent on the road surface. Heavy trucks, on the other hand, while requiring durable surfaces, demand proportionately durable foundations. Heavy motor traffic has a shattering effect on weak foundations. The depth and strength of foundation is a primary consideration in providing roads which will give the motor truck freedom to enter the field of freight transfer to the extent to which it is economically possible.

The cost of constructing roads is largely in proportion to the depth of stone required. The necessary depth of stone will depend largely upon the character of the sub-soil over which the road is laid—the safe bearing pressure of the soil, and upon the maximum weight of loaded trucks permitted to use the road. The maximum weight of truck is a controllable factor, and should be fixed by regulation.

With unlimited funds, roads can be built which will sustain unrestricted traffic. But funds available are limited, and it is therefore necessary that reasonable standards be fixed and strictly enforced, and that roads be then designed for these conditions. A reasonable maximum weight of truck should be determined, one which will serve the greater proportion of commercial needs. It is not good business judgment to spend large sums to build roads to the standard of a few trucks of excessive capacity. Trucks of excessive capacity should be prohibited. And regulation is particularly desirable with respect to roads of minor importance, and at seasons of the year when all roads are weakened by moisture and frost.

BEARING PRESSURES OF SOILS.

Dealing with roads of the broken stone or macadam type the maximum load which a road should carry depends in the first instance on the strength of the sub-soil. There is much variation in the supporting strength of different soils, and under different conditions of moisture and climate. Thus "clay" may vary from hard pan to clay loam; and a dry clay will support a much heavier load than when wet.

Safe bearing pressures of different soils have been determined in a general way for masonry structures. Experimental investigation with special reference to road surfaces would no doubt develop useful data; but in the absence of more direct information, the bearing pressures adopted for the present purpose are those of the general bridge specifications of this department—viz., gravel, 8 tons per square foot; compact sand or firm clay, 4 tons per square foot; clay moderately dry, 2 tons per square foot; wet clay, 1 ton per square foot; quicksand or wet, yielding soil, ½ ton per square foot.

A concentrated wheel-load is carried downward through a broken stone crust to the sub-soil, at an angle which, it is estimated, diverges outward at about 30 deg. from the vertical. Thus the effect of the "macadam" crust is to distribute the wheel-load over a greater area of sub-soil, this area increasing with the depth of the stone crust. The depth of stone in excess of the layer needed for immediate surface wear is therefore regarded as the road "foundation." It is the layer of stone artificially laid over the natural sub-soil to the depth necessary to sustain an unyielding surface.

WEIGHTS OF VEHICLES.

The maximum weight of vehicles (apart from the well recognised influence on bridges) thus largely determines the depth of foundation necessary on a given road—the depth of foundation varying also according to the nature of the sub-soil, and particularly in northern climates, the season of the year during which heavy vehicles may use the road. The constant passing of many light vehicles will, it is true, influence the foundation, and to meet this condition a certain "mass" is required; but a very few heavy vehicles may shatter an insufficient foundation and thus destroy the entire construction. It is necessary, therefore, that the engineer should know whether the maximum load is to be 6 tons, 10 tons, 15 tons, or 20 tons, particularly the maximum load concentrated on one axle or one wheel, and also the width of tyre on which the maximum load is concentrated.

Commonly, a motor truck, itself weighing 5 tons, can carry a load of 7 tons, making 12 tons in all. Two-thirds, or 8 tons, is on the rear axle; one-half of that load, or 4 tons, is on each rear wheel. The disruptive effect of this load on roads of light construction is very great—particularly in wet seasons.

Steam trucks, with steel tyres, in some cases corrugated, are now in occasional use. As an instance, a 5-ton steam wagon in running order with fuel and water weighs about 6 tons, 10 cwt., with about 2 tons, 15 cwt. on the front axle and 3 tons, 15 cwt. on the back axle. Practically all the load would come on the back wheels, so that when loaded with 5 tons the actual weight on the back axle would be 8 tons, 15 cwt., or over 4 tons, 7 cwt. on each rear wheel. Motor trucks carrying 15 tons and weighing in all about 30 tons are being manufactured.

Military experience will probably indicate the most desirable type and weight of truck for future industrial purposes. The great majority of trucks now used by the French armies weigh 3½ tons empty, and 7 to 8 tons loaded. This standard, applied to road construction generally, would effect a great saving in cost as compared with the maximum of 15 or 20 tons, which unrestricted loading will involve. If military preparedness demands provision for heavy artillery loading of 20 tons (and the tendency is still upward) a more moderate standard should be enforced with respect to the great network of purely agricultural and industrial roads which cannot be so built without imposing an unnecessary financial burden.

ONTARIO LOADING LAWS.

The Government schedule has been drawn up with a view to the traffic law of Ontario, which permits a maximum load of 12 tons, or 4½ tons on one wheel, and a maximum pressure of 650 lb. per in. width of tyre. The general assumptions are: That two-thirds of the weight of the vehicle and its load will be carried on the rear axles; that wheel pressure is transmitted downward at an angle of 30 deg. from the vertical; that the various types of sub-soil will safely carry the pressure indicated at the head of each column; that the road crust is solely of broken stone or macadam construction.

From this schedule it is evident that 12 tons is the maximum load which can be carried without producing an excessive tyre pressure; that there is little difficulty in providing for a 12-ton load on gravel, compact sand, or firm clay; that clay only moderately dry requires a crust approximately 10 in. in thickness; that 12 in. will take care of a 6-ton load on wet clay; but that 16 in. would be required for a load of 12 tons (a condition which could probably be taken care of by a Telford base and broken stone surface having a total depth of 12 in.). In the case of quicksand and wet, yielding soil, it is evident that special drainage or other special construction is necessary to meet the needs of any but a light load.

As clay is a soil which has very largely to be considered, its drainage and climatic conditions are evidently important factors, as indicated by the difference in depth of crust required by a moderately dry clay and one which is wet.

ROAD-DESTROYING DRIVING WHEELS.

Self-propelled gasolene motor and steam trucks, in addition to their heavy concentrated load affecting the foundation, have the further disadvantage of exerting a strong shearing force transmitted to the road surface by the driving wheels, so that their use demands not only a heavy and expensive foundation, but an especially durable surface as well. Legislation limiting extraordinary traffic of this description is justifiable, in order that a large increase in the cost of roads may not be necessary to serve the requirements of a few vehicles. Such limitation at the present time forestalls the introduction of unnecessarily heavy vehicles, and avoids cases of individual hardship. Width of the tyre alone will not solve the difficulty, as, owing to the necessary camber of the road surface, excessive width places the load on the edge of the tyre. Should investigation justify it, a less weight than that now permitted in Ontario would be most desirable in the interest of road maintenance.

While the limiting loads for Ontario have been fixed as previously stated, it will be desirable carefully to observe the future trend of commercial traffic in order that, if possible, the maximum load may be still further reduced. In 1917 there were registered in Ontario 4,929 motor trucks.

* Extract from annual report.

Of these, nearly 75 per cent were classed as 1-ton or less; over 97 per cent were 3½-ton or less, or within the general military truck standard; while less than 3 per cent were 4-ton and upwards.

A considerable increase in motor truck traffic appears probable after the close of the war. At the present time in Ontario one vehicle in seventeen is a commercial vehicle; while in the eastern manufacturing States, one vehicle in six is a truck. Growth of motor truck traffic to the latter proportion will undoubtedly create the need for stronger foundations, particularly on inter-urban highways; and over certain qualities of sub-soil the use of concrete in place of ordinary broken stone or Telford base, is strongly indicated.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

COB BUILDING.

To the Editor of The Surveyor.

Sir,—Mr. W. H. Whitaker's advocacy of cob building is not very convincing. Will he quote the paragraph from the set of by-laws upon which he founds his opinion? Also is he prepared in any scheme of housing that may arise in his district to submit plans for cob-built houses to the Local Government Board? Their decision would be interesting, particularly as to the term of years (if any) for repayment of the loan.

Your correspondent says: "I do not see why they should harbour vermin." Now by the soft nature of the material, it would afford an easy and convenient burrow for rats, whereas with solidly constructed walls of brick, stone or concrete, these undesired visitors would find it much more difficult to make a home. The cheap building is not infrequently very nasty.—Yours, &c.,

Building Inspector.

November 4, 1918.

[Two errors, we find, occurred in the printing of Mr. Whitaker's letter in last week's issue, the words "4 inches" appearing instead of "4 feet" in the reference to the carrying up of the walls, and "cement and plaster" instead of "cement or plaster" in the allusion to the outside coating.—Ed. The Surveyor.]

LONDON'S WATER.

To the Editor of The Surveyor.

Sir,—Referring to the epitome of Mr. C. Perrin's annual report to the Local Government Board as set forth in your issue of the 1st inst., in which the quality of the water supplied to the Metropolis is extolled, would it not be interesting to be told whether the samples of water taken for analysis are drawn from the consumers' taps or from the mains of the Water Board?

Unfortunately, although the water supplied to the consumer may be of excellent quality and free from impurities, is it not to be regretted that under the regulations of the Water Board all premises have to be compulsorily provided with a storage cistern, although it is stated that out of all the houses supplied with water 99·1 per cent of them have a constant supply? Why, therefore, should it be necessary to require storage cisterns—except perhaps for the boiler—to be fixed in all dwellings when it is notorious that such cisterns are against the first principles of sanitation, and are, I believe, forbidden in certain enlightened towns? Perhaps if this letter comes under the notice of the skilled advisers of the Water Board they may deign to give some explanation of this apparently insanitary and unreasonable requirement.—Yours, &c.,

Householder.

November 4, 1918.

Ashton-under-Lyne, Stalybridge and Dukinfield (District) Waterworks.—In the area served by these works the total volume of water consumed for domestic and trade purposes during 1917 was, according to the annual report of Mr. George H. Raddin, Assoc.M.Inst.C.E., the engineer to the Joint Committee, equivalent to an average daily quantity of 22·79 gallons per head of population, as compared with 21·98 gallons in the preceding twelve months. The consumption in respect to the domestic supply alone worked out at 18·58 gallons, against 17·65 gallons in 1916, while the average consumption for the total water supplied in respect of domestic, trade, and compensation was 33·73 gallons, against 32·92 gallons in the previous year. The water is obtained from upland gathering-grounds lying to the north-east of Ashton-under-Lyne, and situated in the Pennine range of hills some 5 or 6 miles from that town. The total area of the gathering-grounds is 4,200 acres, and the capacity of the various reservoirs 1,090,939,000 gallons: Last year the volume of water delivered to consumption, including the amount delivered as compensation was, 1,723,851,336 gallons.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is it not to be hoped that when the innumerable reconstruction schemes are tackled after the war, the small but nevertheless important question of sign-posts will receive attention? As the *Auto* of October 25th points out, "All at once a large proportion of our motor vehicles were placed in charge of youthful drivers who, in undertaking long journeys, were often put to much inconvenience owing to the paucity of sign-posts"; but is not this inconvenience equally felt by adult drivers, and could not more uniformity of design, height, and lettering be adopted in the future than has been done in the past?

* * * *

In order to avoid a threatened shortage is it not a rather unusual step for the corporation of Sheffield to propose to store more water in their impounding reservoirs by curtailing the amount of compensation water which has to be passed into the rivers Rivelin and Loxley, and to make up the deficiency by pumping the river water below the point at which the effluent from their sewage works is discharged? As the waters of the river could not possibly be used for domestic supply, does this not seem to be a most ingenious scheme for overcoming a difficulty, and could this not be followed elsewhere where practicable?

* * * *

What must be the condition of the highways in Tangiers, when we read in the *Times* of October 15th that the roads in this city are saturated with liquid sewage from "the unrepaired and totally inadequate drainage system installed only a few years ago by the Public Works Department"? Is it not pathetic also to read that the native petition stated that "the filthy state of their roads renders them impassable for the funerals of the many victims of the epidemic"? And is it surprising that there should be an epidemic if the roads are in this disgraceful condition?

* * * *

Is it a fact that saturated steam is taking the place of superheated steam in the process of disinfecting articles of clothing, &c.? Is it not interesting to trace the progress of sanitary science, and to find sometimes that what was the accepted practice by experts a few years ago may be found to be wrong to-day? Was not this the case in connection with sewage purification for many years, when engineers and chemists were trying to check decomposition, whereas it is now found to be the best assistant in our endeavour to obtain a pure effluent from sewage?

* * * *

Is it not rather interesting to find from a recent joint report on town planning by the engineer, the architect, and the valuer to the London County Council that the Local Government Board have approved a scheme in Ruislip-Northwood for dealing with 5,906 acres; that twenty-one schemes have been authorised to be prepared in twenty districts to deal with 41,713 acres; that application has been made for schemes from two districts to deal with 5,228 acres; and that eight districts have given notice of intention to apply for schemes dealing with about 13,500 acres? Would it not be interesting to know what will be the ultimate cost of dealing with these 66,347 acres?

SHADED STREET LAMPS.

THE WASTE OF GAS AND ELECTRICITY.

On Monday in the House of Commons the President of the Board of Trade was asked whether his attention had been called to the waste of energy available for lighting or heating caused by the use for street lighting in some parts of London, notably in St. James's-street and Piccadilly and in the Euston district, of arc lamps of high candle-power masked by metal covers or shields which only allowed a small fraction of the candle-power to reach the roadway; whether this waste of power could be greatly mitigated by the use of Osram or other incandescent lamps as in some parts of Oxford-street; and whether he possessed and would exercise powers to investigate the subject and put a stop to the waste where it occurred.

Sir A. Stanley said his attention had not been drawn to the particular instance referred to, but he had been impressed with the desirability of securing that there should be no avoidable waste in the consumption of gas and electricity for public lighting, and considerable economies had already been effected in this respect. He would, however, have the matter looked into.

Greenwich Borough Council have applied to the Home Office for permission to remove or reduce the present shading of the street lamps throughout the borough.

Housing Schemes.

By PERCY B. HOUGH HOUFTON.*

Housing has certainly now become a matter of the highest importance amongst questions which concern the well-being of the national future.

What are the main factors to be considered?

I suggest that there are three—(1) Land, (2) lay-out, (3) the house.

As regards the first of these factors I do not propose to discuss in detail the requirements of a good building site. Conditions vary so greatly in different parts of the country that general rules are not of much value. I want rather to emphasise the importance of having sufficient land for each house, of securing in all cases a strict limitation of the number of houses to the acre. The Government proposals for twelve houses in urban and eight in rural districts are a large advance on former practice. But it is a question whether they go quite far enough. There are urban districts where land can be bought for £100 per acre, which would allow a limitation of ten, instead of twelve houses at the trifling extra cost of a halfpenny per house per week. Much depends whether an adequate garden is to be given to each house. It may be said roughly that, with no allowance for open spaces, twelve houses to the acre give a garden of 200 sq. yds., and ten houses give 280 sq. yds. The latter figure is barely sufficient if the garden is to take the place of an average sized allotment. It seems to me that we require a clear policy on this matter. It is a question, too, whether the limitation in rural districts should not be four to the acre instead of eight. Many rural tenants could deal usefully with a quarter of an acre of land.

LIMITATION OF BUILDING DENSITIES.

In any case it will be a greater blunder if the questionably sufficient proposals of the Government come to be whittled down for one plausible reason or other. I emphasise this point strongly, because the reference in the circular letter of March 18th is more in the nature of a pious hope than a definite rule. Already arguments based upon the high cost of land, on sites partly developed, and so on, are being put forward in justification of an increase of numbers. These questions of expediency should give place to the more important fact that the new houses to be built will fix the standard of health and amenity for at least three generations of tenants.

Closely allied with these matters is the question of the effect of limitation on the cost of land. This is a point on which there is a large amount of popular ignorance. I hope to show that open developments cost little, if any, more than the crowded development of the past. In favourable cases it may be less. If the economic effects of limiting building densities were more widely known, I think that the preparation of town-planning schemes would be given new impetus.

It is clear, however, that a drastic limitation of building densities can be applied to large estates without any appreciable economic disturbance. The exceptions to this rule will be where there are a number of small owners who have estates immediately ripe for development. It will be to their interest to resist limitation and to get as high a price as possible, as their responsibilities to the neighbourhood cease with the sale of their limited holdings. The remedy is to town plan, but where this is not practicable at the time, the alternative is for a council themselves to average their purchase prices by including a sufficient quantity of cheaper back land with the more expensive building sites that it may be necessary to acquire. The deductions are that local authorities should complete the first stage of a town-planning scheme before purchasing land, and that town planning would receive an immense impetus if the general public understood its effect on land values.

LAY-OUT.

Turning now to the question of lay-out, it is not possible to lay down any general rules. But it may be said that there are two main types developing, on lines originally suggested by Mr. Unwin—one for steep hillsides, and one for flat or slightly undulating ground. In the first type the most economical form of lay-out is to run narrow terrace roads along the contour lines and to build the houses on the upper sides only, facing the valley. The difficulty is with the main approach roads, which must either zig-zag up the hillsides, or cut diagonally across the contours, leaving acute-angled building plots at all road junctions. Another difficulty is that hilly sites are nearly always bleak and require shelter from prevailing winds, if gardening is to be encouraged.

Both difficulties can be met if the awkward sites are left unbuilt upon, and are planted with forest trees. The trees will form a continuous windbreak when they mature, and give the desired shelter. If an existing piece of plantation can be worked into the scheme, so much the better. But the really important question is that of securing the utmost economy in the residential roads. All houses should be of wide frontage and shallow depth, so as to reduce excavation into the hillside to a minimum. Add to this, that only one side of the road is available for building, and it will be seen that we require about four times the length of road necessary for development based upon narrow frontage houses built on both sides of the street.

In grouping houses on really steep sites, the enclosed square or any method of quadrangular development is out of the question. A single block of four houses placed across the contours would have in some cases a difference in ground level of 12 to 14 ft. As regards appearance, elevational effects become more important than effects to be obtained by an ordered ground plan. The picture to be aimed at should compose well from the opposite hillside, with the public buildings grouped in steps converging towards a church or other central feature in a dominant position.

In the second type of lay-out, for level or undulating sites, some form of quadrangular or irregular-shaped enclosures formed by the road lines will be the usual form of development. The houses will occupy the road frontages, and the gardens or allotments will form the centre part of the enclosure. In most cases it will not be good planning to give the extra land in the form of front gardens. This method is wasteful of building frontages at road junctions, and fails to give open development to the backs of the houses, where they most need it. The quadrangular system is the best, both for health and economy. Here and there a whole quadrangle will be left for an open space, and at strategical points on main roads smaller squares will be planned for the grouping of shops and public buildings. Every care should be taken to preserve the natural beauties of the site. The positions of streams, ponds, woods and existing trees should be considered, and an endeavour made to incorporate these features into the scheme. Low-lying portions of the site which may be unsuitable for building may be found suitable for open spaces, parkways, or allotments. Sites in dominating positions should be chosen for churches and public buildings.

In rural schemes the main points are that the houses should be grouped together and not scattered about on distant farms. There should be proper site-planning, good set-back from main roads, an open space for recreation, and a site reserved for the village hall. In the past villages have grown up at the fork of main roads or the intersection of cross roads. Other things being equal, this custom may be followed with advantage where an entirely new village is being laid out.

But the really important point in all new schemes is the town-planned road. It is not only a question of securing economy in development, important as this may be, but the fact that economy in road construction makes it possible to secure a new and better type of house. We must begin to think of a road, not in terms of arbitrary width, but in terms of the number of lines of vehicles it will have to carry. Thus, for short distances, one carriage width will be enough, especially if there are turn-outs at intervals. For passing vehicles, two carriage widths will be required. Wherever standing traffic may be expected, three carriage widths will be necessary. The unit width wants determining with care, but for the purposes of discussion, I suggest 7 ft. 6 in. This figure would give 7 ft. 6 in., 15 ft., and 22 ft. 6 in. as the normal carriageways for residential roads of different lengths. I think that the relation between length and unit width should not be decided without reference to local conditions, as these vary so greatly. I am disposed to think that 70 ft. is a sufficient distance between building lines, but in this respect also there should be reasonable latitude to meet special conditions. We must not fall into the error of making new by-laws. There are inherent defects in by-law control which no amount of amendment will overcome. By-laws are essentially abstractions, and assume x road, x contour, x direction, x purpose, and x locality; whereas town planning is regional and elastic, and answers all these questions.

(To be concluded.)

* From a paper presented at a meeting of the Town Planning Institute on Friday last.

Urban Council Fined for River Pollution.—At Edmonton, the Enfield Urban District Council were summoned by the Lea Conservancy Board for allowing sewage to pass into the channel connected with the River Lea at Ponders End. Mr. Travers Humphreys, for the board, said that the water which the council allowed to pass into the channel was crude sewage. For the defence it was submitted that, owing to the large number of munition factories that had sprung up, the sewage had almost doubled, and the council had been unable to get sufficient labour and materials to make the necessary additions and improvements. In imposing a fine of £50 and £5 5s. costs, Colonel Bowles said the bench did not think the council had done all they could to get labour and materials.

HOSPITAL ACCOMMODATION FOR CONSUMPTIVES.

LOCAL AUTHORITIES TO PROVIDE ADDITIONAL BUILDINGS.

Local authorities are being called upon by the Local Government Board to provide hospital accommodation for the treatment of tuberculosis. The President of the Board has recently conferred with the Minister of Pensions and representatives of the National Health Insurance Commission in regard to the difficulty experienced in many areas in consequence of the shortage of residential accommodation for the treatment of tuberculosis.

There has been a considerable extra demand on the available accommodation in consequence of the number of men who have been discharged from the Forces suffering from tuberculosis and for whom treatment in a residential institution is necessary. After carefully considering the whole question, Mr. Hayes Fisher is satisfied that a substantial addition to the existing accommodation, especially accommodation for the more advanced cases, is required at once, and he accordingly requests councils to take this matter into immediate consideration.

It is proposed that councils should in the first place ascertain whether some of their existing buildings could not be utilised for this purpose. They should consider the position as regards the hospital accommodation provided in their area for the treatment of acute infectious diseases, the extent to which this accommodation has recently been used, and whether one or more fever blocks could be used temporarily for the treatment of tuberculosis without unduly restricting the available accommodation for acute infectious diseases. Any approval by the board under the National Insurance Act, 1911, of such accommodation for the treatment of tuberculosis would be subject to the condition that the tuberculous patients would be promptly removed in the event of the accommodation being required for the purpose for which it was originally provided.

Councils should further ascertain the position as regards any available accommodation in smallpox hospitals, whether adequate administrative accommodation would be available if such hospitals were to be used for the treatment of tuberculosis, and whether arrangements could be made elsewhere for the treatment of sporadic cases of smallpox. Councils should also ascertain whether there is any suitable poor law accommodation, structurally separate from other such accommodation, which could temporarily be diverted from its present use, taken over by the council, and administered separately by them. It is pointed out that if an existing building, with administrative quarters and staff already provided, could be obtained for the treatment of tuberculosis, the accommodation could be brought into use without delay, whereas if building operations have to be carried out some considerable time may elapse before the accommodation is available. If it is not practicable to utilise any buildings belonging to councils, Mr. Hayes Fisher will be prepared to consider proposals for the leasing of suitable premises which could be used for the treatment of tuberculosis without the necessity of incurring any considerable expenditure on alterations. Councils should satisfy themselves in any such case that the water supply and drainage arrangements will suffice for the number of persons to be accommodated. It is, however, clear that some of the extra accommodation required can only be provided by new buildings; but as the expenditure must be kept as small as possible this should take the form of extensions of existing institutions.

With a view to assisting local authorities to provide additional buildings, the Treasury have agreed that the board may make grants of four-fifths of the capital outlay on such additions.

HOUSING NOW AND AFTER THE WAR.

QUESTIONS OF PRIORITY.

In the House of Commons on Monday the Minister of Reconstruction was asked (1) if the erection after the war of new houses was to take precedence over the repair and upkeep of present houses, which were, in many cases, getting in a ruinous and uninhabitable condition; and which would have the first call on the available supplies of material; and (2) what provision he was making to prepare the material necessary before any house building could be commenced; what prospect there was of getting the stocks of bricks and tiles that would be necessary; and if he had taken into account, in his estimate of the cost of building, the increased cost that would be occasioned if houses partly erected had to wait for the supply of material necessary for their completion.

The Minister of Reconstruction (Dr. Addison) said all the problems involved in the questions had been exhaustively investigated on his behalf by Mr. James Carmichael with the assistance of representative gentlemen connected with the trades concerned, including two Members of that House, and the proposed scheme of operations had been discussed in detail with the chief professional and trade organisations concerned, representative both of employers and employed. One of the governing considerations with respect to priority was clearly the provision of employment with as little delay as possible. Therefore, facilities for the carrying out of repairs which provided for the maximum amount of labour with the minimum amount of material would receive the first priority so far as materials available for building were concerned. The report would be considered by the Standing Council on Priority during the week, and he hoped to publish it in a few days' time. It would thus be seen that the most careful provision had been made beforehand to meet the very difficulties which had been anticipated in the questions.

Barnard Castle Urban District Council have adopted a scheme for the provision of twenty-four houses.

Gnosall Rural District Council have prepared a scheme for the erection of working-class houses in various parts of the area.

Midhurst Rural District Council have instructed the building surveyor to prepare and submit schemes for the provision of working-class houses.

Eastbourne Rural District Council are considering a proposal for the erection of seventy working-class houses, and also for the housing of their employees.

The borough surveyor of Gloucester, Mr. R. Read, has been authorised to obtain the assistance of Mr. H. A. Dancey in preparing the plans of different types of houses for the consideration of the Dwellings for the Working Classes Committee.

Selby Urban District Council have already erected 200 houses, and with a view to a further building scheme after the war the surveyor, Mr. R. B. M. Gray, has been instructed to prepare a plan showing how much land could be utilised for working-class houses.

Dudley Housing Committee recommend the purchase of over 8 acres of land off Northfield-road, Netherton, from Lord Dudley for £5,166, for the purpose of a housing scheme provided he will include at the same rate per yard certain land adjoining Recreation-street.

Easington Rural District Council are urging upon the Government the need for passing a measure that would give municipal councils power to secure land for housing quickly and on reasonable terms—something like agricultural value—so that miners' and other workmen's houses could be built at prices which would not penalise those who paid the rent.

ROAD MAINTENANCE IN WARWICKSHIRE.

TARRING AND TEAM LABOUR COSTS.

During the twelve months covered by the last issued annual report of the county surveyor, Mr. John Willmot, it appears that an area of 978,030 sq. yds. of the Warwickshire roads was tarred at a cost of £5,683 10s., the average cost per square yard being 1·40d. An average of 6·3 square yards was covered per gallon of tar.

The area treated was about 11,000 sq. yds. more than in 1916-17, and the cost per square yard about ·08 of a penny more. The tar cost 5s. per ton more. The Road Board contributed £2,000 towards the cost of the work.

In addition to the above, 421,770 sq. yds. were tarred by Tarmac Limited, at a cost of £3,016. A few short lengths where it was necessary to use an extra thickness of tar and covering material cost 2½d. per square yard, but the bulk of the work was done at 1¾d. per square yard.

The nett expenditure on the maintenance of the county roads during the year was £42,748, and is equal to a rate of £93·1 per mile.

Carting cost 16·2d. per ton per mile, which is more than double the rate for the year before the war. Carting which then cost £100, now costs £220, or, in other words, the amount paid for this work last year—viz., £3,797, would before the war have only cost £1,725.

The cost of horse hire was 15 per cent above the 1916-17 rates, and prices are still rising. The average rate paid for a horse, man and cart per day was 11s. during the twelve months under review.

Bridlington's New Municipal Offices.—The new municipal offices and improvements at the Bridlington Town Hall were formally opened recently. The improvements effected include new committee rooms, new offices for the borough surveyor, accountant, sanitary inspector, and other officials, and a more imposing entrance to the main building.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Blackburn T.C.—The erection of an electricity sub-station adjoining the technical school is under consideration.

Cornwall C.C.—The Finance Committee have approved an expenditure of £1,782 for a pavilion at the Telidy sanatorium.

Egremont U.D.C.—The council have adopted the Baths and Wash-houses Act.

Leigh T.C.—Mr. Richard T. Marsh, of High Peak, Kenyon, near Leigh, has offered to give the town the sum of £10,000 in 4 per cent War Bonds for the extension of the Leigh Baths, or for such other purposes as the trustees of the fund might consider for the benefit of the town.

ROADS AND MATERIALS.

Argyll C.C.—The Kintyre District Committee recommend the construction of a new road on the west side of Kintyre from Kennacraig shore southwards by Kilachamaig Loup Carran, and joining the main road south of Ranachan House stables.

Armagh R.D.C.—The county surveyor, Mr. R. H. Dorman, reported that owing to the decreased amount allowed by the council for maintenance and no grants from the Road Board, and also the insufficient wages offered, the roads had since the commencement of the war gradually deteriorated. The council resolved that the unexpended balances in the different sections should be expended upon the roads upon the basis set out in the county surveyor's proposals.

Belfast T.C.—By a majority of 36 against 8, the city council decided to take no further steps with respect to the strike of street sweepers and the men in the household cleansing department. Alderman Shaw, on behalf of the Improvement Committee, said there was nothing to arbitrate about. The men were receiving 42s. 6d. per week. The work was there for the men to do if they would do it.

Conway R.D.C.—The surveyor, Mr. H. T. Owen, reported that a cheque for £1,500 due from the Government for the repair of the Llanelian road had been received, and that the work on the road had been resumed. Owing to the exceptionally heavy traffic for the conveyance of timber on Government account, the road had become impassable, and some weeks ago three traction engines were embedded in it.

Greenwich B.C.—The borough council are communicating with the War Office, pointing out the heavy wear and damage to which the roads in the borough are subjected by their use for heavy Army traffic, and asking that a payment be made towards the cost of repair.

Hartismere R.D.C.—With reference to the repair of the Diss-Oakley road at Stuston Common, the surveyor (Mr. A. D. Ennals) said he had interviewed the engineer of the Road Board, who informed him that the board was spending £1,146 on the road. This would be a permanent advantage, and from an economical point of view he (the surveyor) recommended the council to adopt the proposal of the Road Board that they (the council) should pay 10 per cent of the cost. The council agreed to the surveyor's suggestion.

Kingsbridge R.D.C.—The highway surveyor, Mr. Stephens, reported that the county surveyor had instructed him to obtain limestone chippings at 15s. per ton for binding material for roads at Stokefleming and Strete. The chairman: That is a shameful waste of money, and the matter should come before the county council. By the time it is drawn to where required and spread it will practically cost 25s. per ton. The surveyor was instructed to defer ordering the chippings.

Lancaster T.C.—Negotiations are proceeding for the purchase of properties between Common Garden-street and Cornmarket-street, and between Cornmarket-street and the Arcade, and a site in Cornmarket-street for a comprehensive street-widening scheme.

Lewes T.C.—In moving the adoption of the report of the Highways and Works Committee, Councillor Glover said they had done all they could during the year to keep the roads in a good state of repair with the material at their disposal. In future the position of chairman of that committee would not be a happy one, as he contended that for every £1 they had neglected to spend in consequence of the shortage of labour and material they would have to pay £2 10s. or £3.

Newry No. 2 R.D.C.—The council have adopted the suggestion of the county surveyor, Mr. R. H. Dorman, to increase the roadmen's wages 2s. 6d. per week, and have fixed the total estimated outlay upon road maintenance for the ensuing year at £8,000.

Northants C.C.—With regard to complaints of the dangerous state of the roads that had been tarred—one speaker alleged that a military officer at Weedon had said he would rather be in the trenches than drive along the road from Weedon to Daventry—it was stated on behalf of the Roads Committee that as the law stood 'bus companies could not be made to pay towards the upkeep of the roads, although they ought to do so. Without tar, roads could not be maintained against the wear and tear of motors, and with tar they became slippery and, in certain conditions, dangerous.

Nottingham T.C.—It is stated that the town council propose to carry out a widening scheme in Friar-lane, the chief thoroughfare leading to the Castle. The junction of Friar-lane with Market-place is described as one of the most dangerous places in the city.

Tiverton R.D.C.—The novel incident of a complaint from aliens (Austrians) with respect to their pay for road work was discussed by the council upon the receipt of a letter from the Home Office. The men complained that their wages (25s.) had not been raised since they had been taken on. They contended that they should be paid the same wages as others who did the same class of work. The surveyor (Mr. A. J. Mildon) said that out of 25s. paid the aliens they had to pay 15s. for lodgings, so they got 10s. clear. He added that the men were Austrians. The chairman (Mr. H. G. New, J.P.): If the men get just enough to live on that is good enough for them. They must make some sacrifices. They are competing against our labour, and are treated like princes, compared with the way they treat our men in Germany. The vice-chairman (Mr. T. A. Leach) said that aliens cost the council £7 10s. a mile on the roads to teach them the work. The Chairman: The aliens must think it a great privilege to be allowed out of gaol. It was decided to reply to the Home Office that the aliens had cost the council a great deal to teach, and that they saw no reason for raising their wages.

Warwickshire C.C.—It was stated that there would be a surplus on the general county rate of £31,000, and that the council might regard this as a debt to the main roads account.

SEWERAGE AND SEWAGE DISPOSAL.

Coventry T.C.—It was reported that the profit on last year's working of the sewage farm was £2,823.

Manchester T.C.—The city council are considering a recommendation to effect sewer repairs at an estimated cost of £1,000.

WATER, GAS, AND ELECTRICITY.

Croydon T.C.—The accounts of the water undertaking for the last financial year show a surplus of £6,720.

Edinburgh T.C.—To meet the urgent necessity for the supply of current the city council have approved a recommendation of the Electricity Committee for the installation at the Dewar-place station of a 5,000 k.w. set and an additional cooling tower—the latter if considered indispensable. Mr. Girdley, representing the Ministry of Munitions, urged that the plant should be ordered without delay. The estimated cost is £70,000, or £55,000 without the cooling tower.

Grimsby T.C.—The Electricity Committee report that large extensions at the electricity works will be necessary at an early date.

Oldham T.C.—The town council are considering a scheme for installing a new gas plant at Higginshaw, at an estimated cost of £10,000.

Stoke-on-Trent T.C.—Recommendations by the Electricity Supply Committee have been approved for an extension of plant in connection with the central electricity power house, at an estimated cost of £102,000. Sir John Snell, in a report, stated that these extensions would only cover the needs of the district for the next two or three years. He did not consider the corporation were justified in incurring any expenditure other than was absolutely necessary on the present central power station, the site of which was not suitable for a large power station. His advice was to make no further extensions at the present power house, to find a more suitable site for the future principal station, to shut down the four local stations as soon as possible, and to be prepared with a well-considered scheme to supply electricity within a wide radius of the borough. The council will consider the larger issues in Sir John Snell's report on a future occasion.

Welshpool T.C.—It was reported that arrangements were being made for the visit of an expert to advise as to the

provision of electric lighting for the town. The Water and Electric Lighting Sub-committee reported that the dam at Sylfaen Pool required repairing, and that to maintain the pressure of water from the pool it would be necessary to construct another filter bed, the cost of which, with the pipes, was estimated at £5,000.

MOTORS AND MUNICIPAL WORK.

GULLY CLEANSING MACHINES.

Lambeth Borough Council have adopted a recommendation for the purchase of a vacuum motor gully cleansing machine from Messrs. Straker Squire for £1,100. It has also been resolved to accept delivery from Leyland's Motors, Limited, of a steam-driven vacuum gully emptying wagon for £675, when the machine can be completed. In a statement placed before the council it was shown that by using the motor machine the cost of emptying would be only 8s. a ton compared with 12s. 3d. per ton by the present method by which the gulleys are emptied by manual labour.

ELECTRICS FOR WOLVERHAMPTON AND STOKE.

Messrs. Ransomes, Sims and Jefferies, Limited, of Ipswich, have built for the Wolverhampton and Stoke-on-Trent Town Councils two electrically-propelled Orwell lorries. They are 3½-ton automatic-tipping vehicles, driven by two independent motors through countershafts and chains on the back wheels. The battery is divided into two trays placed under the chassis frame, and capable of being readily pulled out for inspection. It should be stated that both vehicles were driven by road from the makers' works at Ipswich to their destination at about nine miles per hour, being charged at power stations *en route* from East Anglia to the Midlands.

Batley Town Council have agreed to purchase a motor wagon for conveying coal to the gasworks.

Brighton Town Council have agreed to purchase a motor ambulance for the conveyance of patients to the borough sanatorium.

Halifax Town Council have accepted the tender of Messrs. Dennis, Brown, at £1,300, for the supply of a Dennis' 60-65 6-horse power 500-gallon turbine motor fire engine with first-aid outfit.

Johannesburg municipality have now a gas-driven motor lorry, the first, by the way, to make its appearance in the streets of the city. At the price ruling locally the cost of gas is about 2½d. per mile run. There is an acute shortage of petrol in the city.

Hayes Urban District Council, having received a reply from the Local Government Board with respect to their application for sanction to borrow £1,500 for a motor fire engine, are now asking the Ministry of Munitions for a priority certificate.

LOCAL GOVERNMENT BOARD INQUIRIES.

The Editor invites the co-operation of Surveyor *readers with a view to making the informaton given under this head as complete and accurate as possible.*

INQUIRY HELD.

Bootle T.C. (November 4th. Mr. W. H. Collin).—£32,825 for the purchase of land for a housing scheme after the war. It was explained that it was proposed to purchase 50½ acres of land in Orrell Ward from Lord Sefton at £650 per acre. Objection was raised to the proposed purchase by the local property owner's association on the ground that the price to be paid was excessive. Evidence as to the necessity for the scheme and the suitability of the site was given by the medical officer, Dr. Dalcy, and the borough engineer, Mr. B. J. Wolfenden.

APPLICATIONS FOR LOANS.

Evesham R.D.C.—£15,550 for the erection of twenty-four cottages.

Haverhill U.D.C.—£1,320 for replacing machinery and repairs at the waterworks.

LOANS SANCTIONED.

Burnley T.C.—£13,000 for protective works at Hurstwood reservoir.

Leeds T.C.—£23,330 for a 6,000-k.w. turbo-alternator and condensing plant, on condition that £16,670 is defrayed out of revenue.

Lowestoft T.C.—£5,982 and £2,494 for works of sea defence, the former for twenty years and the latter for ten years.

Lancaster Corporation Bill.—The Lancaster Corporation Bill, which gives further powers in regard to their water undertaking and street improvements, and other matters was on Tuesday ordered to be reported with amendments for third reading.

PERSONAL.

Mr. H. Blackman, surveyor of highways to the Battle Rural District Council, has resigned after twenty-eight years' service.

Mr. W. H. Spicer, engineering assistant in the Coventry City engineer's office, has received an increase of salary of £50 a year.

Mr. George H. Widger, sanitary inspector to the Godstone Rural District Council, has been appointed borough surveyor and sanitary inspector of Totnes.

Mr. S. Palmer, borough surveyor of St. Ives, Cornwall, who has been called up for National Service, informed the town council that he would not appeal for exemption on his own behalf, but the council have asked him on their behalf to make an appeal on the ground that he was engaged on work of greater importance than in doing civil work for the Army.

Major Percy Johns, R.F.A., borough surveyor of Maidenhead, has just been promoted Lieut.-Colonel. He has been serving since the first day of the war, and was for three years in command of a Field Battery in India. He returned to England in October, 1918, and being found unfit for general service owing to malaria contracted abroad, has been stationed in Ireland during the past twelve months. Lieut.-Colonel Johns was granted the Territorial Officers Decoration in 1913.

OBITUARY.

Sir James Restler.

We regret to have to record the death, which took place suddenly on Monday in London, of Sir James William Restler, K.B.E., M.Inst.C.E., M.I.Mech.E., chief engineer to the Metropolitan Water Board. Sir James was born in 1851, and educated privately and at King's College. He was appointed chief engineer to the Southwark and Vauxhall Water Company in 1883, and passed with it to the Metropolitan Water Board in 1904. The works constructed during that period, and costing over £2,500,000, including engines capable of raising 140 million gallons per day, reservoirs to hold 1,800 million gallons, very large filter beds, and five tunnels under the Thames. Sir James was consulting engineer to a number of private and local water enterprise, director of several companies, and chairman of the Metropolitan Munitions Committee. He was knighted last June.

Surveyors' Institution Jubilee.—It has not been possible, owing to the war, to celebrate the completion of the fiftieth year of the institution in the manner which the occasion would in other circumstances have demanded. The president, Mr. John Oakley, will, however, take the opportunity of the opening meeting of the session on Monday next to give an address dealing with the fifty years' history and work of the institution. The meeting will take place at 5 p.m. All interested are invite to attend. Non-members will be admitted on presenting their visiting cards.

FOR OTHER ADVERTISEMENTS
See End of Paper.

GENERAL ASSISTANT.—Assistant required with good knowledge of figures and general work of a Surveyor's office. Salary £3 per week.—Alan Bromly, Borough Surveyor, Godalming. (3,909)

ST. NEOTS URBAN DISTRICT COUNCIL.
APPOINTMENT OF SURVEYOR.

The St. Neots Urban District Council invite applications from qualified persons for the post of Highway Surveyor.

The area of the district is 3,669 acres; population, 4,171; mileage of roads, 8 miles.

Applicants should have had experience with main roads, or have been trained in a Borough or District Surveyor's Office.

The person appointed must provide his own clerical assistance if any is required, and also keep his own books. The appointment will be determinable by three calendar months' notice on either side.

Applications (endorsed on the outside "Surveyor"), stating age, experience, qualifications and salary required, and accompanied by copies of not more than three recent testimonials, should reach me not later than the 23rd November, 1918.

Any further information or particulars required can be obtained on application to me, accompanied by a stamped addressed envelope.

T. SPENCER,
Clerk to the Council.

Market-square,
St. Neots,
Hunts. (3,908)

THE METRIC SYSTEM.

By Harry Allcock, M.I.E.E., A.M.I.Mech.E.

[In a pamphlet recently issued by the Decimal Association, Mr. Allcock makes the following among other comments upon the report of the Committee on Commercial and Industrial Policy after the War. The committee reported against the early introduction of the metric system of weights and measures, and Mr. Allcock endeavours to show that the arguments upon which the decision is based are open to considerable criticism.]

In its historical review of the previous efforts to establish the metric system in this country the committee states that, although the use of the metric system has been permissive for the last twenty years, the number of metric weights and measures presented annually for verification and stamping is now only about 1 per cent of the number of Imperial weights and measures similarly presented.

The committee has apparently failed to realise that the Act of 1897 alone could not possibly extend our use to the metric system because, for example, it is obviously impracticable for tradespeople to have two different sets of weights—in different systems—in concurrent use on their shop counters. It is also unreasonable to expect British manufacturers to employ the metric system in their workshops so long as our railways are permitted to refuse consignments of their products unless the Imperial equivalents of the weights and dimensions are also stated.

The 1897 Act has thus proved a dead letter and further legislation is already long overdue. As in the case of the daylight-saving scheme, the community as a whole cannot enjoy the benefits of the metric system until its use is established by law.

Difficulty of spare parts and renewals of machinery.

The report states that, in order to enable the British machinery maker to supply spare parts and renewals, it would be necessary for him to continue the Imperial system in use, side by side with the metric system, for possibly a generation after our official abandonment of the Imperial system, and that he would accordingly be required to work in two systems for that period.

This objection evidently arises from an unwarrantable assumption that our adoption of the metric system would necessarily involve altered dimensions of machine parts. Such is not the case, because obviously any dimensions now expressed in inches and parts thereof can be readily expressed in millimetres and parts thereof. It should be remembered that a tolerance of one-hundredth part of a millimetre demands much more accurate work than is usually obtainable in our machine shops, so that those opponents of metric measures who claim that metric equivalents of Imperial dimensions can be shown only by employing six figures or so after the decimal point are obviously drawing on their imagination and appealing to the credulity of those whose support they seek.

British manufacturing engineers have for years worked in mils (·001 inch), and the worst the metric system could demand of them—viz., ·01 m/m—would thus represent a saving of one figure in written dimensions. In practice for small dimensions two or more figures would generally be saved because the dimension ·1 m/m (roughly four mils or ·004 in.) would be quite fine enough for most of their work. Equivalents expressed even so approximately as the nearest whole millimetre—thus dispensing entirely with the decimal point—could not differ from the original Imperial dimension by more than one-fiftieth part of an inch.

Furthermore, the passage of an Act requiring all sales to be made in terms of the metric system would not affect the liberty of any person to continue his use of the existing weights and measures for manufacturing purposes until such time as he himself chose to abandon them. All existing patterns could thus be employed for the full term of their useful lives, and when, in the normal course, they became worn out or obsolete in design, they could be economically replaced by new ones based on the metric system.

Manufacturers engaging in new industries should, at the outset, base their designs on the metric system, and it is gratifying to note that this has been done, for example, in the case of the British magneto industry, which has been so successfully established in this country since the outbreak of war.

Value of a universal language of quantity.

Regarding the point raised by the committee that if we now adopted the metric system we should be required to work in two systems for a generation, it may be remarked that, even were this true, it would be much less appalling than our alternative prospect of employing two systems for all time. The fact remains that, whether we like it or not, we already find ourselves obliged to use the metric system to an ever-increasing extent in scientific work, in manufacture and in export trade, and the retention of our own Imperial system thus handicaps us by compelling us to employ two systems where one would suffice.

When we realise that our national existence depends upon our ability to sell British manufactured goods to all nations—*i.e.*, to develop a world-wide trade—it is obvious that Great Britain more than any other country would benefit from the establishment of a universal system of weights and measures.

The use of the metric system is already obligatory in thirty-four countries, representing a population of 437 millions, and optional in a further eleven countries having a population of more than 727 millions. By ourselves adopting it we should practically ensure its establishment as the universal language of quantity; but, on the other hand, it is equally clear that the Imperial system could never become the universal system because of its inherent defects.

The "improvement" of the Imperial system.

Realising that although it cannot recommend the metric system it also cannot establish the superiority of our existing system, the committee adopts the expedient of advocating the so-called "improvement" of the Imperial system. To that end the members "emphasise the advantages, already widely recognised, of using decimal subdivisions of our basic units, such as the inch and the pound weight."

This leaning to decimalisation is especially noteworthy, in view of the contradictory opinion expressed elsewhere in the report "that for practical purposes binary divisions are better than decimal."

In this connection it is instructive to recall the recommendations of the Select Committee of the House of Commons, which, so long ago as 1862, reported that "it would involve as much difficulty to create a special decimal system of our own as simply to adopt the metric system in common with other nations, and if we did so create a national system, we would in all likelihood have to change it again in a few years, as the commerce and intercourse between nations increased, into an international one."

That was fifty-six years ago—further comment is superfluous.

If, instead of decimalising English units, we could agree forthwith to express all weights and dimensions in terms of single units (*e.g.*, pounds, yards and gallons), abolishing all the chaotic multiples of 12, 3, 5½, 40, 8, &c., the way would be paved for our early adoption of the metric system.

PUBLIC COMPANIES.

DUNLOP RUBBER.

A circular issued by the secretary of the Dunlop Rubber Company, Limited, states that the issue of the report and balance-sheet for the year ended August 31st must be considerably delayed, owing to the continued depletion of the staff and the great increase in business (amounting practically to 50 per cent). The directors, being of opinion that a further distribution to the ordinary shareholders should be made now, have declared an interim dividend for the half-year ended last August of 1s. 6d. per share on the ordinary shares, and warrants were posted on Wednesday last. The ordinary shares now number 1,500,000 compared with 1,000,000 when the previous interim dividend was announced.

PARENT TYRE.

Presiding on the 30th ult. at the meeting of the Parent Tyre Company, Limited, Sir Arthur du Cros said that the accounts reflected, for the first time, the result of the change made in the company's investments a little over a year ago, when it was decided to sell the ordinary shares then held in the Dunlop Rubber Company at £4 per share, and the royalty agreement for £340,000. The major part of the proceeds were applied in the acquisition of 3,000,000 7 per cent cumulative "C" preference shares of the Dunlop Rubber Company, at the price of 19s. 6d. each. As the value of 7 per cent Dunlop preference shares could safely be taken at 21s., or 21s. 3d. on the basis of the market price of the 6½ per cent "B" preference shares of that company, it might fairly be claimed that the capital thus reinvested would show an appreciation of approximately £250,000 when the transaction was finally completed. The change over of investments had moreover resulted in a nett increase of profits last year of £61,000, to a total of £176,000—the highest profit made by the company since the year 1910.

As that income was derived from investments yielding secured and cumulative returns, it might be regarded as a permanent increase. Beyond those advantages there had also been a very considerable appreciation in the market value of this company's shares. The price of the deferred shares when the negotiations for the realisation of their old investments commenced was approximately 27s., whereas on the publication of the balance-sheet they were quoted at 64s. 6d. at which they yielded on the dividend and bonus recommended a return of nearly 9 per cent. Even at that price they could not be said to have reached their full

development. It was still open to the directors to engage in active business operations in a suitable direction, and the board had little doubt but that the great resources of the company could one day be turned to useful advantage. The business of the Dunlop Rubber Company, from which they derived most of their income, continued to enjoy great prosperity.

The report was adopted.

Insanitary Dwellings at Abersychan.—With respect to the insanitary state of certain properties at Abersychan which the sanitary inspector, Mr. W. R. James, described, and the owners of which had been served with statutory notices without effect, the inspector said he felt that where owners could afford to remedy the evils complained of, as they certainly could in this case, drastic and prompt action should be taken. In one bedroom large patches of plaster had fallen from the ceiling, and the rain poured in upon the beds. This room, giving an air space of 900 cub. ft., was occupied by seven persons, or four persons in excess of the common lodging-house standard. The other house was in very much the same condition. The walls were running with water, stairs were in a ruinous state, and the tenants were compelled to put water-proof covers on their beds to save the rain coming in on them. These houses were absolutely unfit for habitation and could never be made fit. It was resolved that the owners should be summoned to the next meeting of the council.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

WATERWORKS FITTER AND TURNCOCK.—November 11th.—Tunbridge Wells Town Council.—Mr. W. H. Maxwell, borough engineer and surveyor, Town Hall, Tunbridge Wells.

ASSISTANT ENGINEERING FITTER.—November 11th.—Gosport and Alverstone Urban District Council.—The Surveyor, Council Offices, Gosport.

SURVEYOR'S ASSISTANT.—November 11th.—Gosport and Alverstone Urban District Council. £3 3s. per week.—Mr. H. Frost, surveyor, Council Offices, Gosport.

ARCHITECTURAL ASSISTANT.—November 11th.—Grays Urban District Council. £200 to £250 a year, according to qualifications.—Mr. Arthur C. James, surveyor, District Council Offices, Grays, Essex.

SURVEYOR AND INSPECTOR.—November 12th.—Bulkington Urban and Nuneaton Rural District Councils. £200 a year.—Mr. C. Blakeway, clerk, Rural Council Offices, Nuneaton.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

BEDFORD.—November 13th.—For the erection of buildings and reinforced concrete coal bunkers.—The Engineer, Electricity Works, Cauldwell-road, Bedford.

BRISTOL.—November 22nd.—For the reconstruction of the single-floor transit shed at Avonmouth Dock.—Mr. T. A. Pease, engineer, Dock Engineer's Office, Avonmouth Docks, Bristol.

Engineering: Iron and Steel.

BEDFORD.—November 13th.—For the supply and erection of two water-tube boilers, mechanical stokers and induced draught plant.—The Engineer, Electricity Works, Cauldwell-road, Bedford.

MANCHESTER.—November 14th.—For alterations and additions to the coal and coke handling plant.—Mr. F. A. Price, superintendent, Gas Department, Town Hall, Manchester.

WARRINGTON.—November 19th.—For the supply of underfeed mechanical stokers.—Mr. F. V. L. Mathias, borough electrical and tramways engineer, Howley, Warrington.

Roads.

MANCHESTER.—November 12th.—For the supply of best Harlingden grit setts and 12-in. by 8-in. kerb.—The Secretary, Paving Department, Town Hall, Manchester.

CAMBS.—November 20th.—For the supply of broken granite, basalt, slag and tarred macadam.—The Clerk, Cambridge County Council, County Hall, Cambridge.

CHELMSFORD.—December 2nd.—For the supply of about 500 tons of Guernsey, Penmaenmawr or Leicester granite broken to 2-in. or 1½-in. gauge, and ¾-in., ½-in., and ¼-in. granite chippings.—The Borough Engineer, Municipal Offices, Chelmsford.

Stores.

WEST HARTLEPOOL.—November 18th.—For the supply of concrete kerbstones, flags, scoriae and whinstone channel blocks and paving setts, hand, machine and unbroken whinstone, pitch, tar and lime.—Mr. Nelson F. Dennis, borough engineer and surveyor, Municipal Buildings, West Hartlepool.

KING'S LYNN.—November 20th.—For the supply of coal, oilman's goods, ironmongery, waste and packing, brushes, castings, disinfectants, stoneware pipes, timber and plumber's work.—Mr. Raymond A. Newstead, borough surveyor, Town Hall, King's Lynn.

BRADFORD.—November 23rd.—For the supply of articles for the Tramways Committee.—Mr. R. H. Wilkinson, tramways general manager, 7 Hall Ings, Bradford.

NOTTINGHAM.—November 28th.—For the supply of cement, blue lias lime, red brick, blue bricks, timber, stoneware pipes, iron castings, iron gullies, York flags, kerb, granite setts, broken granite, ironstone slag, chippings, river gravel, picks, shovels, scoops, coal, ironmongery, scavenging and other brushes, disinfectants, refined tar, pitch and creosote oil.—Mr. Arthur Brown, city engineer, Guildhall, Nottingham.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

NOVEMBER.

8.—Institution of Municipal and County Engineers: Metropolitan District Meeting, 92 Victoria-street, S.W. 5 p.m.

11.—Surveyors' Institution: Mr. J. H. Oakley delivers his presidential address. 5 p.m.

DECEMBER.

13.—Institution of Water Engineers: Winter General Meeting, Burlington House, London. 2.15 p.m.

This one simple Paint System covers all your Housing Scheme Needs

For outside and inside woodwork.

CONVENIENCE, efficiency, and economy are 3 things most needed in painting the Nation's new houses. Adoption of a uniform painting system based on standardised, simple, but irreproachable paints offered specially for Housing needs will achieve all 3. The Berger Housing Paints are the **only** paints so offered. They are **convenient**—because all surfaces are covered by 3 paints only, and because they are consistent in quality and colour throughout the Kingdom; **Efficient**—because their efficiency is necessary to maintain our 158 years' reputation; **Economical**—for they are the best paints we can make, and the best is cheapest because it cuts out repainting labour.

For inside walls.

Pompeian Paint, ready for use in 16 colours for outside and inside woodwork.

Matone, washable at wall paint in heavy liquid form in 27 colours for inside walls.

Lustro varnish stain in 7 wood effects, for floors, &c.

Write for comprehensive colour folder and particulars of

For floors.

Berger Paints

for Housing schemes

Lewis Berger & Sons, Ltd.,

Makers of Colours, Paints, & Varnishes,

HOMERTON, LONDON, E.9.

Established 1760.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. NOVEMBER 15, 1918. No. 1,400.

Minutes of Proceedings.

Peace at Last!

The suspense with which Great Britain, and indeed the whole civilised world, awaited the German reply to the armistice terms dictated by Marshal Foch on behalf of the Allies only served to accentuate the unique outburst of joyous enthusiasm when it became known that the enemy had capitulated, and that the Great War was at an end. The terms to which the enemy envoys were constrained to agree are such as to show that the task to which we set our hands in 1914 has been well and completely accomplished—a result which has only been attained by the unselfish devotion and unsparing service of citizens of every class. We are indeed proud at this time to record the part that has been played by municipal engineers. Not only have many of the younger members of the profession taken their places in the firing line, but many more of all ages have assisted in the building up of that wonderful road organisation which did so much to make the final victory possible. We must beware, however, of imagining that because this work has been finished nothing more remains to be done. On the contrary, when these gallant men return to civil life they will find that the exigencies of war have caused the municipal engineering clock to be put back by at least a decade, and they will at once be called upon to play a leading part in urgent works of reconstruction. Our system of highways—of which we used to be so justly proud—has suffered enormous depreciation, while works of water supply, sewerage and sanitation generally have also fallen into comparative disrepair, and no new works have been constructed. It is indeed to be hoped that the Government will realise without delay the desirability of affording special facilities as regards finance, labour and materials for proceeding with this work of civic reconstruction. If this be done we are confident that those municipal engineers who have proved their mettle on active service will soon be able to show that "Peace hath her victories," and that their brethren who have perforce been holding the home front will also bear a full and honourable share in the fulfilment of this great task.

* * * *

A Motor Trunk Road Scheme.

The question of a great motor trunk road from London to Edinburgh is discussed by a writer in the *Newcastle Journal*, who quotes a gentleman who is stated to have made a special study of the subject as saying: "It is suggested that we should spend millions upon widening the existing canals in England to bring them up to the standard of those in Belgium, which can carry barges of 300 tons burden, and make new waterways. I say make wide motor-roads instead of canals, which are antiquated, and which means much handling of goods from the factory to the shipping port. Main motor-roads could be made at a much lower cost. I am certain that a 100-ft. wide trunk road could be made from London to Edinburgh and Glasgow at a considerably less cost than a double track of railway. By following the East Coast heavy gradients would be avoided, but where they were necessary they could be steeper than those of railways, for a motor can climb a hill much easier than a locomotive. That such a trunk road is necessary, that it will come soon after the war, there are no two opinions. The question arises, Where is the labour to be found to speedily execute the work? I would suggest that the Labour Battalions, who have done such excellent service in France, be brought over and put on the job." The proposal, according to a scheme already mapped out, is to construct a road along the East Coast route, to be joined at different points by others, such as one starting at Bristol, passing Birmingham and the great industrial area round it, while another serving Liverpool, Manchester, Leeds and the woollen districts of Yorkshire would join the trunk line about York. These secondary trunk lines would connect with all the existing main roads, thus bringing small centres quickly into touch with the main arteries. Northwards the great highway from York would pass to a point located between Stockton and Darlington, thence through the great Durham coalfield, touching Gateshead and into Newcastle. Then the road, it is suggested, would pass through Northumberland, touching either Berwick or passing more inland to tap the industrial centres of Hawick and Galashiels. North of these it would divide, one portion running to Glasgow and the other to Edinburgh. It is a scheme of great magnitude, but it is not impracticable, and it certainly raises the question whether it would not be better to concentrate upon this instead of, as the disposition in official circles seems to be, upon resuscitating our antiquated and dilatory canal systems.

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Superannuation.

The fact that the special committee on superannuation which was recently set up by the Local Government Board contains only three municipal officers and not a single municipal engineer, renders it particularly desirable that the various service organisations should watch their proceedings with the greatest possible vigilance. One of the first things to be decided in connection with the financial aspect of any scheme that may be proposed is as to whether it shall be on a contributory or non-contributory basis, and an important resolution on this subject was passed at a recent conference convened by the N.A.L.G.O. The conference, which comprised representatives of the various sectional and professional societies of municipal and local government officers, was strongly in favour of a non-contributory scheme, "providing similar benefits to those granted to civil servants and now proposed for teachers, with adequate provision for the present older officers in the service." It goes without saying that if the committee could be induced to adopt this view, the result would be more favourable to municipal officers, and especially to the older ones, than would be a contributory scheme; but it must not be forgotten that this demand involves a more favourable scheme than that which the poor-law officers succeeded in obtaining some years ago. The question is really bound up with that of salaries, for in view of the miserable remuneration paid by certain local authorities, even a small contribution on a percentage basis would be a great hardship. Perhaps a solution might be found in a general up-grading of salaries and a contributory scheme modelled on that set up by the Poor Law Officers Superannuation Act.

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Housing in Dublin.

It is probably safe to say that in no part of the United Kingdom is the housing problem more acute or more difficult of solution than it is in Dublin. Taking the Government standard of 300,000 houses for England and Wales, the existing shortage in Dublin on the basis of population ought to be 2,500, whereas in fact no fewer than 16,500 new houses are urgently required, and 13,000 existing dwellings call for radical and immediate improvement. These facts are clearly brought out in the excellent and comprehensive report on Dublin Housing which has been prepared by Dr. Cowan, the chief engineering inspector to the Local Government Board for Ireland, in accordance with instructions received from that body. The report modestly purports to be "a memorandum giving some general ideas as to how a complete scheme for housing the working people in Dublin, who are said to be living in unsanitary dwellings, could be

carried out in sections for different parts of the city, which could be taken up in rotation or according to needs." The first thing that strikes the reader of the report is the complete sympathy which Dr. Cowan has with his subject. Moreover, he is not afraid to take the large view. Precedents, he says, should be suspected and avoided rather than followed as guides in forming schemes for the radical improvements necessary in Dublin. The main part of the report is occupied with the discussion of four primary questions—namely (1) land and its acquisition; (2) public or private building; (3) town planning and lay-out; (4) the construction and arrangement of the houses themselves. As regards the first of these questions, Dr. Cowan states that sites as a rule must probably be secured by compulsory purchase, although every reasonable effort should be made to obtain them by agreement. With regard to the second point, the interesting conclusion is reached that in the special circumstances the houses should be erected by a board representing the Government, the City of Dublin, the Urban District Councils of Rathmines and Pembroke, and Dublin County. With regard to the number of houses per acre, it has long been recognised that this is bound up with the question of transit, and there is much to be said for Dr. Cowan's suggestion that if the time is not yet ripe for free or almost free transit in the city there could be little objection to an arrangement long recognised as economic by railway companies—namely, to attach for a number of years to each new house in certain zones a pass on the tramways, either free or at a low cost. Finally, with regard to the houses themselves, Dr. Cowan wisely advocates the two-bedroom standard as a minimum.

IRELAND'S MAIN ROADS.

A COUNTY SURVEYOR'S SCHEME FOR NATIONALISATION.

In his presidential address on the 4th inst. to the Institution of Civil Engineers of Ireland, Mr. J. O. Moynan, county surveyor, North Tipperary, advocated the nationalisation of the principal roads in Ireland for the purpose of developing inter-communication in the country, contending that there was little hope of any further extension of the railway or canal systems.

It was, he said, almost impossible to estimate the amount of capital required to construct the Irish country roads. The total mileage maintained out of public rates in rural Ireland was now about 56,000, but not more than a quarter of this was of general public utility. Fourteen thousand miles were now required as inter-communication roads, and he put their capital value at £17,500,000: but if the total cost of all Irish roads was considered he would not put it at a much lesser sum than close on £40,000,000. As inter-communicating channels roads must take the first place, as without them as feeders both canals and railways would be useless.

A NATIONAL BOARD.

He advocated a scheme for the nationalisation of the more important roads under the administration and control of an Executive Road Board, and removed from the authority of the county councils, who should contribute to the funds of the Road Board annually the amount raised for the maintenance of these roads in their respective counties, taking the average of three successive years as the basis of this contribution, any balance required to be found by the National Exchequer, or by transferring to the new body the entire fund derivable in Ireland from the petrol tax and motor licences, the whole amount to be administered by an elective body under Government control, who could raise sufficient funds on the security of their joint revenue to repair and strengthen, straighten and widen all roads under their authority as required.

A TWO-FOLD RESULT.

The result of carrying out such a scheme would be two-fold—all the national roads would have a uniformly good surface and would serve as an object lesson to the local road authorities. When brought to a satisfactory condition the roads would be available for motor service, for passengers and parcels. A well-equipped motor service working on good roads would be sufficient for the requirements of the outlying districts, and could be provided without incurring excessive cost. It had the great advantage over fixed services in being extremely flexible, cars being capable of leaving the regular routes to make side calls when required, thus bringing the conveyance to the very doors of parties requiring them. The possibilities of such road services were now so unlimited that he thought the railway era in Ireland was closed as regarded future expansion, and he felt inclined to say that "canals were, railways are, and roads will be the most important of the three."

COLLECTION OF ORGANIC WASTE.

NATIONAL SALVAGE COUNCIL'S APPEAL TO LOCAL AUTHORITIES.

The Board of Agriculture are anxious that every available material suitable for pig-feeding should be utilised for that purpose, and with this object in view they have recently issued an official leaflet of "Advice to Pig-Keepers."

The separate collection of household waste suitable for pig-feeding has now been organised and is being carried out by many local authorities with encouraging results, the material being either fed direct to pigs kept by the councils themselves or sold to pig clubs or other pig-keepers. No difficulty should therefore be found in obtaining a ready market for the material. Where separate collections have been started it has been found that, on a general average, about 5 lb. of household waste is collected per house per week.

In these circumstances the National Salvage Council strongly urge those local authorities who have not yet seen their way to arrange for a separate collection of household organic waste to consider at once the best means, according to local conditions, whereby an efficient collection can be ensured in their district. They suggest that an appeal should also be made to all householders for their willing co-operation.

It may be mentioned that by a Regulation recently made under the Defence of the Realm Acts, power may be given to local authorities who consider it expedient to require householders to keep organic waste in separate receptacles.

SUPERANNUATION.

A NON-CONTRIBUTORY SCHEME URGED.

At a conference called by the National Association of Local Government Officers, and held on the 2nd inst. at Caxton Hall, Westminster, representatives of sectional and professional societies of municipal and local government officers adopted a resolution urging strongly that the recently appointed Departmental Committee on Superannuation should recommend the introduction of a national superannuation scheme for the officers employed by local authorities in England, Scotland and Wales on a non-contributory basis, providing similar benefits to those granted to civil servants, and now proposed for teachers, with adequate provision for the present older officers in the service.

Resolutions in support of this have been passed at meetings of the Metropolitan, Eastern and South Wales Districts of the Institution of Municipal and County Engineers.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

THE AMALGAMATION PROPOSALS.

To the Editor of The Surveyor.

Sir,—May I be allowed to state that I consider the suggested amalgamation of the Institution of Municipal Engineers with the Institution of Municipal and County Engineers to be not just?

If this sort of thing is done and persons are admitted to the latter institution without first passing the examination, how can it be known who is qualified and who is not? If a doctor has not passed his examination, he is not allowed to practise at all. This principle should be carried out in relation to public health engineers. If a man is qualified, let him sit for the examination and prove it.—Yours, &c.,

Justice.

November 12. 1918.

Torquay Pavilion Profits.—From the report of the borough treasurer it appeared that the nett profit on the Torquay Pavilion undertaking for the year ending September 30th was £2,989, as against £1,040 in 1917. The town council thanked the manager, Mr. C. G. Price, for his services in bringing the undertaking to such a highly satisfactory financial condition, and agreed that in addition to his salary of £360 a year he should receive 5 per cent of the profits of the café.

Road Maintenance Defined.—Road maintenance means very largely that a limited amount of time and effort are expended on the repair and improvement of roads in order that a comparatively great amount of time and energy may be saved in travel and transportation over them, in order that still other traffic which would have to take less economical routes will follow the improved road, and in order that still other traffic which would not exist may be created and developed.—Mr. W. A. MacLean, Deputy Minister of Public Highways for Ontario.

Military Road Works in France.

By T. SALKIELD, M.INST.C.E., Major R.E.

[*Concluded from last week.*]

"Necessity is the mother of invention," and what, owing to the non-existence of a technical word, must be called a "composite road" was often brought into existence, and consisted of wood—rafters and baulk timbers from destroyed villages—sleepers, fascines, trunks and branches of trees, bricks, stone—anything, in fact, which could be hastily collected to make a road or repair a section of any road after destruction by shell-fire. As time and circumstances permitted these so-called composite roads were taken up and reconstructed, or, rather, replaced as far as possible, with materials similar to those usually specified for the construction of roads.

Wooden sleepers were used very extensively in road works, and this kind of construction was most useful for making sidings and building approach roads at railheads and other similar places where traffic was always concentrated and of necessity heavy. Very excellent jobs have been done with sleepers under most difficult conditions, and men regularly employed on this kind of work became very skilful. One party suffered very severely, and the instance will be referred to later.

Short lengths of switch-loop or alternative routes, made necessary either by excessive traffic or to avoid sections of road which received more than the usual amount of shelling, were rapidly constructed of beech slabs spiked to bearers of the same kind of material. It was necessary to camouflage each section as soon as it was completed, as experience proved that the Hun airman soon spotted this kind of work and quickly let us know that he had done so. The German is either an excellent gunner or has much luck, for he often scored "bull's-eyes" on our roads.

"PAVÉ."

The sett-paved roads known as *pavé* can be placed in all categories from first class to no class at all. These *pavé* roads, however, were often of great utility and saved enormous quantities of broken stone which an ordinary macadam road would have swallowed up without the least compunction. *Pavé* roads suffered from the same inherent structural weakness already referred to as existing in water-bound macadam roads, and it was most difficult to maintain in position the outer setts when the paving abutted upon soft earth. In places where a kerb formed an abutment this trouble did not occur, but it was not unusual for the kerb to be lifted up by excessive wheel loads. When the abutment was damaged, destruction rapidly followed, so that it was necessary to take preventive measures, and this was successfully done by driving in stout stakes for the support of planking, old iron rails, or branches of trees, and backing these with broken brick or stone. Paviors were classified *rarœ aves*, so it was necessary to train men for the work of reconstructing damaged sections of *pavé*, and although these men never developed the finesse of the paviors of France and Belgium (which could hardly be expected), the patch repairs made by hastily-trained Britishers answered satisfactorily to all traffic demands. Corrugations, undulations and often a complete break-up of sections of *pavé* were experienced as soon as a thaw was established after a period of severe frost, and many have been the anxious moments when faced with such a condition of things. Sett-paving—*pavé*—will always recall the quaint old towns and villages of France and Belgium and conjure up visions of familiar places behind the line, where in billets happy hours have been spent with the best fellows it is possible to find in the world—hours sandwiched in 'twixt the discomforts and dangers of life at the Front. A comfortable billet and cheery mess were ample compensations for strenuous days and less happy surroundings, not even marred by an occasional shell or the bomb-dropping proclivities of the Hun airman.

Reference has already been made to the use of revetment along roads for the support of banks and paving, but it was also necessary to do similar kind of work where ditches and watercourses existed near roads, otherwise the roads became distorted and the open channels ceased to exist, being closed by the lateral thrust of the heavy traffic. Revetting in such cases was easily carried out by the use of stout, pointed, round pit props, driven in and strutted to flat face pieces of wood in the opposite bank. Between these stakes hurdles were fixed and the road loads further distributed by laying behind the stakes and parallel with the road one or two fascines, according to the intensity of the traffic and width of road, and covering such fascines with broken stone.

We are all lovers of trees—the shady avenues formed by the glorious trees which grow on so many of the fine *routes nationale* in France are a feature of that country. Not even the wilful destruction of houses caused the author as much bitterness of feeling against the vandal Hun as did the deliberate felling of trees, both fruit and ornamental, and especially the desolation and nakedness produced by the wicked destruction of avenues along highways. One's feelings were less poignant for the trees bordering the roads which had suffered from heavy shell fire—these remained like gaunt sentinels pointing bony, menacing fingers, and the efforts put forth by these trees in the springtime to hide their gauntness were as pathetic as the sight of the sawn-through apple trees in the orchards which blossomed in their murdered state.

To provide accommodation for the roadmen was always a task of some difficulty—so many factors had to be considered. It was necessary that they should be located as near their work as possible, or at least in central positions, and yet it was difficult to split up a unit. Often the distances from their locale were so great that working parties had to be sent out each morning in lorries and brought back again in the evening. Often a place would become untenable owing to shell-fire, night bombing, or both; but, whether in dug-outs, tents, huts or billets, the men were always cheerful, and deserve well of their country.

UPKEEP ON LINES OF COMMUNICATION.

No account of war roads would be complete without a reference to the upkeep of roads on lines of communication. These roads have the same characteristics as those already referred to and link up the outer world with the areas of active operations. They run from the largest port and land bases to smaller ones and form the first link in that wonderful chain of roads scattered over so wide an area along which flows the life stream of the British Armies in France. On these roads the traffic is not so intense, and proceeds in a slower though not so orderly a manner as on the roads in the forward areas. Time is not here so much the essence of the contract, and consequently it is not necessary to employ the best labour. On these roads German prisoners of war are employed, as they are far removed from danger. John Chinaman—known as "Chink"—is engaged mending our ways, and one wonders what he thinks of the white man while he laughs and works. One lot, never having seen a motor car before, laid themselves on the ground to see how the feet of the occupants propelled the vehicle! The brawny West Indian does not like our climate, but works well when the sun shines. East Indian coolies are very tractable and good workers in all weathers. French skilled labour is employed, but to a very limited extent. As far as possible roads on lines of communication live on the resources of the country through which they pass; consequently flint digging is carried on to a large extent, often far from profitable if viewed as a money-making proposition; but war is not that, and when no alternative exists has to be pursued.

EXTRACTS FROM A DIARY.

The following extracts from a diary kept by the author may be of interest:—

"A terrible place in a state of absolute desolation—mud knee-deep. Hard, uphill work ahead starting a new order of things here. Taking over from the French, who are leaving this area."

"Just returned from inspection of roads in the midst of dugouts and desolation."

"All around are sad evidences of wreckage, human and material, wrought by the devilish inventions of man—but this is war, or at least a part of the game."

"Tried to discover with the aid of a map certain roads—they no longer exist—nothing but shell-holes."

"On the roads one sees a never-ending stream of men going in or coming out of the trenches, and not only men, but transports for their sustenance—guns, ammunition, road-destroying lorries and caterpillar tractors dragging 'Saucy Salls' and 'Black-eyed Susans,' huge guns, to which the humorous Tommy has applied these names of endearment."

"Down with fever—have been delirious. The eternal lorry question about the transport of road materials uppermost in my mind. Imagined it would be better if lorries could be measured off in a plastic state in road lengths instead of being counted out. Also perplexed about accommodation for men working on the roads."

"Car broken down—weary trudge for many miles."

"Ten of my roadmen killed in their billet by one shell to-day."

"Strikes one as strange to see the extraordinary type of men now in the British Army. The men selected for road works are not of necessity those best qualified for fighting. Saw to-day a poor, dejected-looking specimen of mud-stained humanity with a shovel—seemed to be the first time he had ever been required to use such a tool. Called up his corporal and asked who the man was. 'Oh! sir,' said he, 'he's a professional cornet-player in one of the big London orchestras.'"

"German aeroplane flew very low over one of my roads to-day where some unarmed men were working. The gentle Hun swept the road with his machine gun and hit two men."

"Tried to pass along —— road to-day. Found everybody seeking cover, as the Germans were plastering it with large shells."

"—— railhead heavily shelled. Off-loading stone from trains had to stop."

"Five air-raids last night—not much sleep for any of us."

"Found a man belonging to a Labour Company to-day sheltering under a piece of corrugated iron, as shrapnel was flying about. With this little cover he felt quite safe. Reminded me of the ostrich in the desert."

"Big advanced railhead seriously damaged to-day by destruction of

large ammunition dump; also siding for off-loading trains of road material. Road office, close by, had a lucky escape."

"Roads in terrible condition, consequent upon thaw following month's hard frost. Have never seen roads so cut up; the chalk foundations have acted like gunpowder."

"No diminution of anxiety about roads. No materials for repair available."

"Labour considerably augmented to cope with thaw conditions. Great difficulty in supervision, as the men are unskilled. Owing to lack of suitable road materials ruined villages have become quarries. Churches destroyed by shell-fire could supply stone, but these must be respected. What vandals we become by war! It's a difficult and heart-breaking job trying to make and maintain roads without materials and with unsuitable labour."

"One long struggle to keep roads going by homœopathic doses of any material that can be found. Road conditions just now remind me of a sick man at the point of death, but who with the greatest possible difficulty is being kept alive."

"Frost and thaw, thaw and frost alternate these days, with occasional snowstorms—the very worst climatic conditions for even a good road with light traffic."

"Surveyed what was once a road, but which, owing to constant shell fire and heavy traffic, is now a mud track. Told that this must be at once converted into a passable road, as it is an important connecting link. Will have to be done with fascines, local chalk, and the ruins of an adjacent village, as no stone is available."

"Glorious morning—waking thought 'Road construction,' and with what object—simply to facilitate movements of men and materials for the killing of Germans. A grim thought this, and yet how gladly one does it!"

"Inspected vantage point just evacuated by the Germans. Realise now why one of our roads was so often shelled. Standing on this spot it seems almost possible to throw a cricket ball on to the road, and yet from the road itself this place cannot be singled out from its surroundings, as the country is very wooded."

"Reconnoitring what was only a few days ago 'No Man's Land,' Not the slightest sign of roads—the whole area honeycombed with shell-holes. Roads to be reconstructed to enable forward movements to be made."

"Diary not posted for three days. Really too tired at night to write it up. These are very strenuous days."

"Several additional roads made over to me to-day, owing to changes in corps areas. Everybody working at high pressure, and some of them very peevish—not to be wondered at."

"Lots of peevishness about. Plenty of work and worry. Weather too appalling for words—heavy snowstorms alternating with sleet and rain."

"Country under a mantle of pure white snow—very beautiful even in the midst of desolation. Seems as though Nature is trying to hide this hideous picture of destroyed towns and villages, ruined fields and forests."

"Inspected a new area to-day—same story of damage, but here wanton destruction done by the Germans. On every hand beautiful orchard trees sawn through, and currant bushes uprooted and chopped into small pieces, and all houses destroyed, not by shell-fire, but by explosive charges. Delayed charges left in places on the roads by the kultured Hun. These, though dangerous and giving trouble, have not so far resulted in injury to anyone. Saw a place to-day on a paved road where the surface was cracking. Explored the spot, and discovered that an elephant trap had been made—a large hole excavated under the embanked road, and which had been used as a dugout. The timbers had been withdrawn and a large circular hole made in the roof to within 2 ft. of the paving. Here, again, Hun cunning was foiled!"

"Last day in charge of certain roads, which have now been included in back area. Inspected all of them to-day. What a change has come over the scene! Recently these roads were carrying ceaseless traffic—to-day all is quiet. Why? Because the largest railhead has been pushed forward. Armies have moved on, leaving this desolated area for further desolation ahead. The tide of war sweeps on, but the dead stay behind. The solitary grave—the group of graves—the large cemetery show up now that all is so quiet; but the solitary grave by the wayside tells its own story, and leaves a deep impression on the mind."

"Another move forward. Change of camp to-day—and what a day! Incessant rain—the whole area a sea of mud."

"Off on leave to-day after six months' strenuous work."

Sorry to say that the diary was not kept very carefully on return from leave; only occasional notes were made. In the foregoing extracts an effort has been made to avoid repetition; all references to the bravery and experiences of the men who volunteered for road works in France have been excluded; but one instance of many must be recorded.

We were told to construct with sleepers a very large siding for the accommodation of lorries at an important railhead which was so near the Front that it was debated whether it should be there or not. German aeroplanes were constantly over the place watching operations, but nothing happened until the work was nearing completion; then annoying and irregular shelling started. But the work proceeded—we were anxious to get the men away, and told them so, but not one of them showed the white feather, although each man knew that, instead of irregular shelling, at any moment a severe dose of Hun venom might descend. At last it did. Trains of ammunition were being unloaded into lorries, and a stack of charged petrol tins stood close by where a large party of roadmen were finishing their job. Like bolts from the blue, shells began to descend; lorries laden with shells were struck as were also the trains—the petrol was fired and hell let loose. The party suffered severely. With difficulty, owing to shrapnel bursts, the wounded and severely burnt men got away, the killed were removed later. My car driver was temporarily paralysed by shell-shock, and had to be evacuated. The Bosche played sad havoc, but next day work was resumed by Tommy Atkins roadman and all damage quickly made good.

Some time in the future the war road veterans will have reunions and fight their battles over again. What interesting events these will be! That the society may be numerous and the average age of each member of it work out ultimately at 100 years is a most sincere wish of the author, who also desires that when his period of service in India has expired he may be able to renew the friendships he made with so many good fellows whom he met while engaged upon the most interesting and exciting adventure of a lifetime.

MUNICIPAL ENGINEERS AND TOWN PLANNING.

DISCUSSION OF MR. CAMPBELL'S SIX POINTS.

The points brought forward by Mr. A. H. Campbell, burgh engineer of Edinburgh, in the valuable paper [see The Surveyor, September 20th last] which he submitted at the town planning conference held in connection with the annual meeting of the Institution of Municipal and County Engineers were considered at various district gatherings of that body last week, the object in view being a crystallisation of the views of the members as a whole on the matters dealt with in the contribution. The points, to the number of six, were as follow:—

(1) That this war-time is our work-time for the preparation of town-planning schemes as the essential preliminary to housing.

(2) That the Local Government Boards should recognise the responsibility of those who thus labour in the cause of public health, and entitle them to recognition by the State in manner and form advised by the Royal Commission on Housing (Scotland).

(3) That preliminary procedure to town planning should be greatly simplified and shortened, and thereon the Local Government Boards of England and of Scotland should be memorialised; towards this end it is suggested that advisory boards of practical technicians in town planning might be constituted upon the invitation of the central authorities to co-operate with their officers in this work, and in the drafting of a set of "General Provisions" as model clauses for town planning.

(4) That amending legislation be introduced to bring *all* undeveloped building sites in urban areas within the scope or operation of town planning, without the necessity of establishing in relation to them a *primâ-facie* case.

(5) To deal with old or over-built or badly planned areas in cities as town-planning areas, and to apply the provisions of the Town Planning Act to their clearance or to reconstruction on approved town-planning lines.

(6) To facilitate the acquisition for public purposes (particularly housing and town planning) of lands and heritages in manner as advised by the Royal Commission on Housing for Scotland.

At a meeting of the Metropolitan District at which the six points were discussed, Mr. G. W. Humphreys, the district chairman, presided, those present including Messrs. T. W. A. Hayward (Battersea), the president, H. E. Anderson (Lambeth), H. Percy Boulnois (Westminster), W. Jones (Deptford), J. P. Norrington (London), H. Shaw (Ilford), C. Chambers Smith (London), J. Sutcliffe (Deptford), F. Wilkinson (Deptford), and E. Willis (Chiswick).

PREPARATION OF SCHEMES.

On the suggestion as to the preparation of town-planning schemes as an essential preliminary to housing, Mr. Boulnois remarked that this was no doubt a valuable thing, but whether local authorities could undertake such work with their depleted staffs was another matter, and it would be a long time before we got back to normal conditions.

Other members expressed their agreement with this view, and the following resolution, moved by Mr. Willis, was passed:—

"In view of the early necessity of improved housing, it is imperative that local authorities should take preliminary action in the preparation of housing and town-planning schemes so far as existing staffs are available."

RECOGNITION OF MUNICIPAL ENGINEERS' SERVICES.

Introducing the point as to the recognition of the services of municipal engineers in connection with town planning, Mr. Hayward reminded the meeting that he made reference to this in his presidential address as one of the things which they as an institution were out to get from the Local Government Board. The joint committee appointed by their own institution and the Society of Engineers to deal with the question of the status of municipal engineers had embodied in their report the recommendation of the Scottish Royal Commission on Housing that appointments should be subject to the approval of the Local Government Board, and that officials should not be removed from office except by or with the sanction of the board. That would ensure security not only for the official, but for the general public, who would be protected against being saddled with the services of incompetent men.

Mr. Willis observed that engineers and surveyors would undoubtedly have to tread very heavily on the toes of private owners in connection with town planning, and it was undesirable that any advice which it might be necessary for them to give should be allowed to prejudice their positions.

It was agreed to support Mr. Campbell's proposal with regard to the matter.

SIMPLIFICATION OF PRELIMINARY PROCEDURE.

With regard to the third point, Mr. Boulnois said there was no doubt preliminary procedure in connection with town planning was very cumbersome, and the Local Government Board, having seen the working of the Act, might be inclined to alter it. But in supporting the proposal before the meeting he did not think they ought to adopt that part of it referring to the appointment of advisory boards of practical technicians in town planning. As a rule the surveyor of a town was perfectly capable of carrying out a

town-planning scheme, and where he was not the necessary assistance could always be called in.

This being the unanimous feeling of the meeting, the first part only of the paragraph was adopted.

COMPULSORY TOWN PLANNING.

The proposal that all undeveloped building sites in urban areas should be brought within the scope of operation of town planning without the necessity of establishing in relation to them a *primâ-facie* case was approved, with the addition of the words "provided that the interests of private owners be reasonably safeguarded."

TOWN PLANNING IN BUILT-UP AREAS.

In submitting for acceptance the proposal with regard to this point, the chairman said he had come to the conclusion from a study of the question in London that except where over-built or badly-planned areas were in the hands of a single owner the ideas set forth were impracticable.

After discussion it was agreed that the provisions of the Act ought to apply only "wherever possible," and with this qualification the paragraph was approved.

ACQUISITION OF LAND.

The suggestion embodied in the paragraph regarding the acquisition of land was afterwards adopted, and the meeting terminated.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Does it not seem rather remarkable that any man who has received any engineering training at all should be content with a salary of 35s. a week as an assistant surveyor, when an ordinary labourer can earn considerably more? When we learn that this princely amount is being paid to such an official in Wales, is it at all unreasonable to ask if the services of municipal engineers will ever receive proper recognition?

* * * *

What is the use of clamouring for superannuation if salaries are to remain at the present figure, and the scheme is to be a contributory one? What is the use of preaching the necessity for thrift when a man is expected to keep himself "respectable" on such beggarly salaries as are now paid in many districts? When will local authorities realise that they cannot expect to be well served unless they pay a fair market price for brains and energy?

* * * *

Has not the time arrived—if it is not already too late—for the Government to interfere with regard to the acquisition of the various watersheds and gathering grounds throughout the country, and take the necessary steps to secure the proper and efficient control of our water supplies in the future? Is it not evident that unless something of the kind is done at once on a comprehensive scale, trouble may arise in the scramble for water supplies that will inevitably take place, and that the smaller communities may be squeezed out by the larger and more powerful cities and boroughs? In this connection should not the question of "white coal" or water power also be seriously considered?

* * * *

Is there not an exceedingly interesting account in the *Indian and Eastern Engineer* of September with regard to a report made by Mr. J. A. Brodie, the eminent city engineer of Liverpool, on certain questions referred to him as to the widening and construction of streets which are contemplated in Calcutta? Does not Mr. Brodie's report show a thorough grasp of the subject and give suggestions that are not only of value as regards Calcutta, but also for any town-planning scheme that may be contemplated for a Western as well as an Eastern city? Are not his remarks with regard to the comparative widths of carriageways and footpaths alone well worthy of careful study?

* * * *

Is it not to be hoped that at the next general election municipal engineers will be able to get direct representation by the election of at least one or two members of their profession? Are there not frequently coming before Parliament many questions upon which the advice and views of such representatives would be of the greatest service to the nation?

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Was there not in the October number of the *Common Cause* an excellent letter from Lady Selborne on the financial side of rural housing, in which she drew attention to the economic danger of municipal or Imperial subsidising of rents? Is she not right when she says: "It is no small advantage over your neighbour to have an excellent house at half its proper rent. Who is to choose the beneficiaries"? She submits that public money spent on water supply, public parks, sewerage and so forth is money well spent and good policy, but is she not perfectly justified in saying at the conclusion of her letter, "To take a certain number of people and present them with half their rents seems to me an indefensible proceeding"?

RECENT PUBLICATIONS.*

TEMPORARY AND SEMI-PERMANENT WATER SUPPLIES. By Major V. P. Smith, R.E. (professional papers of the Royal Engineers, Royal Engineers Institute, Chatham). Price 3s. 6d. nett. Chatham: W. J. MacKay & Co.

This book being written for the use of the Royal Engineers, and dealing specially with temporary and semi-permanent water supplies, has necessarily a special purpose, and is therefore not upon the face of it applicable to ordinary practice; on the other hand, it is actually so well written and so clear in its descriptions that it might well be useful to water engineers in their ordinary practice, especially where they have to deal with some sudden emergency or difficulty, such as is common in dealing with the water supplies of temporary camps, hospitals, and so forth, but which is rare in ordinary work.

The first five sections of the book deal with wrought-iron pipes and fittings, cast-iron pipes, valves, tanks and cisterns. The sixth is concerned with the consumption of water, and engineers who at the beginning of the war had to deal with Government Departments will note with some satisfaction that the Royal Engineers at any rate have learned something from the war. We are told that some of the figures in the military pocket books are very misleading—which is indeed true. We are told that the American cantonments are allowed 50 gallons per head, and a quotation is given from THE SURVEYOR dealing with the military cantonments at Ripon, completed in 1915, in which it was stated that experience had shown that the consumption exceeded the estimates considerably. Many similar instances might be quoted.

Water supply calculations are dealt with briefly and usefully, and then follows a water-supply scheme for a standing camp, and some very useful calculations for determining the sizes of mains required for estimated supplies to groups of buildings, &c., according to the requirements of each case. These practical deductions will be specially useful to students and young engineers. There is a special section on the water supplies of American cantonments, and it is interesting to note that when America entered into the war, unlike the British Government, they obtained the services of the very best water engineers in the country, and consequently most excellent results were obtained in a very short space of time. The other sections deal with ablution rooms and bath houses, hot water supply to temporary bath houses, horse water points, filling points, rapid pipe laying and the purification of water. The notes upon rapid pipe laying are particularly interesting. With regard to the purification of water it is interesting to note that in ordinary practice chlorination is effected in a very simple manner, but the concluding note on this subject is all-important—viz., that whatever is done should be done in full co-operation with the medical authorities or someone capable of testing the efficiency of the methods employed. The book contains twenty-eight plates illustrating the subject very fully.

SEWAGE TREATMENT IN JOHANNESBURG.

In his last-issued annual report, Mr. G. S. Burt Andrews, M.INST.C.E., M.I.MECH.E., engineer to the Municipality of Johannesburg, refers to a scheme of underdrainage at the city's sewage farm which was undertaken at the suggestion of the farm manager.

On reaching the farm the sewage undergoes preliminary treatment in sedimentation tanks before it is run on to the land. The preliminary treatment consists of screens, detritus pits, sludge elevators and four sedimentation tanks, having a total capacity of one million gallons. The sludge is run into trenches and covered with earth. According to analysis, this treatment reduces the solids from 311·5 to 47·5 parts per 100,000. The average quality of screenings and solids removed from the sewage is 22 and 50 tons per day respectively. Mr. Andrews points out that even with this preliminary treatment and the extraordinary quantity of solids removed, the effluent contains more putrescible matter than the average crude sewage of towns in Great Britain.

During the rainy season it is necessary to utilise the whole of the irrigable area on the farm—viz., 882 acres. It is at this period that the greatest difficulty is experienced, and for this reason the council agreed to land filtration for that portion of the effluent which is to be applied to areas in proximity to dwellings and the public road which passes through the farm.

The scheme consists of the levelling off and under-draining of approximately 12 acres of ground. This has been done by forming a series of lagoons between the main carriers. The drainage pipes are laid about 50 ft. apart and about 3 ft. below the surface.

The estimated cost of the scheme was £2,600.

* Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

Public Service Motor Vehicles.

AN AFTER-WAR QUESTION FOR LOCAL AUTHORITIES.

One of the questions with which public authorities will, with the close of the war, inevitably be faced is that of the substitution of self-propelled vehicles for the existing system of horse haulage. When we consider the present price and cost of keep of strong cart horses, it is evident that on economical grounds alone there should even now be an advantage in adopting a well-considered public service of motor lorries. This economy will be increased as the price of petrol diminishes, as it is bound to do as ships become liberated for the transportation of the fuel.

Mechanical haulage has many advantages over horse haulage. More weight can be carried, a higher speed can be attained, less accommodation is required in the way of stables and sheds, the cartage of fodder and manure is avoided, and in the case of the removal of house refuse the long and objectionable stream of dust carts approaching the tip or destructor becomes a thing of the past. The need for wheelwrights, paint-shops, shoeing smiths, sick bays, harness rooms, fodder lofts and similar paraphernalia also disappears, with a consequent diminution in the extent of the space required for the depots.

It must not be forgotten that, whereas it is extremely unlikely that much improvement can be made in the mechanical power of the horse, there are endless possibilities in the improvements that can be effected almost weekly in the design and power of the mechanically-propelled vehicle. The horse may become a little cheaper than at present, but his strength or life cannot be materially altered. It is different in dealing with a machine: we know what to expect from it, we know the treatment which will prolong its life, we can calculate the exact cost and measure the amount of work it has performed.

It would probably surprise many local authorities if they were told the real cost of their horse cartage at per ton of work per mile, with due allowance made for interest and sinking fund on the land and buildings, repairs, taxes, rents (if any), fire insurance, supervision, and a host of things which are frequently omitted from the calculations that are made when comparing the cost of horse haulage with that of mechanical haulage. Is the short life of the horse taken into consideration, his hours of sickness, and the cost of veterinary attendance? Is anything allowed for the constant repairs of the carts and wagons and frequent scrapping of old vehicles past repair?

It would be exceedingly interesting if a really correct statement based on a period of years could be prepared showing the actual comparative cost of such a service, reduced to ton miles, with that of a similar service executed by mechanical haulage. Even then it is doubtful if it would really be of great value, as it is well known that considerable strides are being made in the economical working of motor wagons and in their strength and capacity; nor must it be forgotten that motor drivers are becoming more and more experienced, which should go far in the future to prolong the life of such vehicles, as well as to minimise the need for repairs.

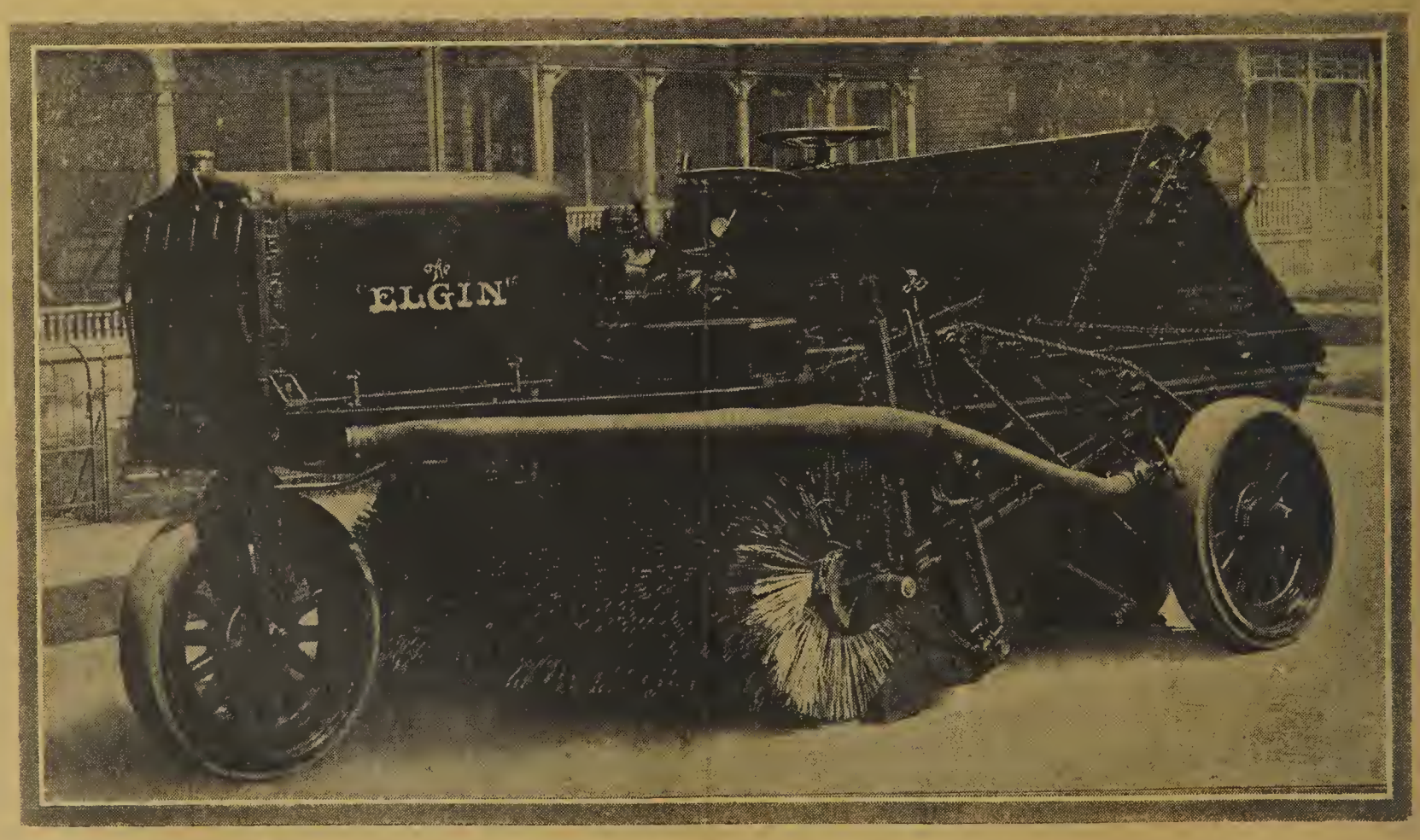
Although there are already some public authorities who have prudently foreseen the advantages of mechanical haulage over horse haulage, there is an immense number who have either been too timid or lacking in imagination to investigate the matter. It is true that at the present time manufacturers are unable to execute orders for the supply of motor wagons, &c.; none the less, it behoves the officials of those bodies who may be contemplating a change from horse to mechanical transport to take up the study of the question at the earliest possible moment and before the rush of work which will inevitably occur when peace is finally declared.

We are anxious to assist in this movement, and would welcome any information—however slight it may be—on the question, either from users or manufacturers of the various self-propelled vehicles which are suitable for public work. There has been much controversy in the past, for instance, as to the suitability of petrol-driven vehicles for the house-to-house collection of refuse, and many other points on which difference of opinion exists will readily occur to our readers. There is a large and growing body of municipal engineers and cleansing superintendents whose experiences with various forms of mechanical traction, if placed on record, would prove of the greatest interest and value to others, and we extend a cordial invitation to all such officials to favour us with some particulars of the results they have obtained from the vehicles in their possession.

THE "ELGIN" SWEEPER.

The Jowett Motor Manufacturing Company, of Grosvenor-road, Bradford, are the British agents for the "Elgin" motor road sweeper, illustrated herewith.

Under the control of one man the "Elgin" sprinkles, sweeps and collects in a single operation, and its popularity in America is such that at the present day more than fifty cities are using it. Being mounted on only three wheels, it can turn round in almost its own space. The broom and elevator have two speeds, independent of the speed of the machine—fast for very dirty streets and slow where better conditions prevail.



The "Elgin" Motor Road Cleanser.

Water distribution is effected by atomisers, and the amount can be varied by turning a hand wheel beside the driver's seat. The water tank has a capacity of nearly 200 gallons.

The hopper which holds the sweepings has a capacity of nearly 3 cub. yds.—about an hour's run under average conditions—and it is easily and very quickly emptied by the operation of a lever at the driver's feet.

The machine is capable of travelling at a speed of 6 miles an hour, sweeping an 8-ft. path. This is equivalent to a maximum capacity of 48 miles 8 ft. wide per 8-hour day.

ELECTRIC VANS FOR DUST COLLECTION.

Following the receipt of a report on dust collection by electric vehicles prepared by Dr. Buchan, their medical officer of health, Willesden Urban District Council have decided upon the purchase of three 2-ton electric wagons.

The essential conditions in the selection of a vehicle for the purpose mentioned are set out in the report as under:—

(1) The capacity must be at least 7½ cub. yds., equivalent to 2½ tons by weight of house refuse.

(2) The body must be low slung for easy loading. (It is suggested that there might be folding sides to the body in order to get the greater part of the loading done without a ladder.)

(3) The body should be of galvanised steel with a wooden strip at the top to save damage to the vehicle and bins. The wooden strip would be renewed when worn out.

(4) Covers of wood or metal should be provided.

(5) The chassis should be adapted to take a trailer.

(6) Both wagons and trailer should be mechanically tipped.

(7) The motive power should be sufficient for a range of 45-50 miles on one charge.

(8) The vehicles should be able to turn in a small circle.

One trailer should also be obtained to be used in the event of bad weather, a breakdown, or other contingency preventing regular collection.

In the area to be covered by the vehicles it is proposed to purchase there are 3,971 houses yielding approximately 4,000 tons of house refuse per annum, or on the average approximately 14¼ tons on each of the 279 working days in the year. Three drivers and six dustmen would be employed.

The capital cost is estimated as follows:—

	£	s.	d.
Three vehicles (ten years' life)	4,000	0	0
Charging plant	150	0	0
Registration and number plates	6	0	0
	£4,156	0	0

On an average daily running of 25 miles per vehicle, the annual costs are estimated as follows:—

	£	s.	d.
Wages of drivers and men at, say, 50s. per week each	1,170	0	0
(N.B.—It is a matter for decision whether these men should be paid, say, 3s. 6d. per ton moved plus, say, 50 per cent of the tots, or whether they should receive a wage without tots or a wage with all the tots.)			
Repairs and maintenance of chassis, at 5d. per mile	43	11	10
Repairs and maintenance of batteries, at 4d. per mile	34	17	6
125 units of electricity per week, at 1½d. per unit	60	18	9
Insurance, £30	30	0	0
Tyres: 6 975 miles per vehicle, at 1d.	87	3	9
Six licences	1	10	0
Rent of garage	50	0	0
Repayment of capital costs at 6 per cent ...	564	0	0
Rent of shoots, at 2s. per load—2,000 loads ...	200	0	0
Sundries, at ·25d. per mile	21	16	0
Total	£2,263	17	10

GAS TRACTION AT CONSETT.

Consett Urban District Council are now using gas instead of petrol as motive power for the 3-ton Halley lorry employed for refuse collection, the change being necessary on account of the refusal of the Petrol Control Committee to grant a licence for petrol. The original body of the vehicle (which was purchased second-hand) was removed, and a covered tipping body constructed at a cost of £275. The gas container has a capacity of 250 cub. ft., and it has been fixed on a frame 10 ft. by 6 ft. placed over the engine and driver's seat. Since the vehicle commenced work at the beginning of July last year it has been running continuously without a breakdown. The container can be filled in seven minutes from a 3-in. supply main, and six fillings per day of nine hours are necessary. The wagon takes six loads daily to a tip, a distance of a little over a mile from the town. Motor haulage has therefore proved quite satisfactory in practice at Consett, and the probability is that its use will be extended. There are no difficulties in the application of gas, and there will be no disposition to return to the use of petrol until the price of that article has been considerably reduced.

PETROL SUPPLIES AND PRICES.

The standing joint committee of Mechanical Road Transport Association, which committee has been urging on the Government the national necessity for the earliest possible reduction in the prices of petrol and paraffin, has been informed by the Director of the Petroleum Executive, Sir John Cadman, K.C.M.G., that there is good ground to hope that unless there is an unexpected change for the worse in the position, some reduction in these prices will be possible either at the beginning of December or January next. The joint committee is arranging a further deputation on the subject of decreases in prices and also on the subject of increases in supplies.

GAS TRACTION IN GERMANY.

At the annual meeting of the German Association of Gas and Water Engineers, held recently in Berlin, the question of a continued demand for gas for road motors after the war was discussed. The belief in a future increasing demand is based mainly on the shortage of horses. But other advantages possessed by gas will recommend its use. The gas companies already established can provide conveniently distributed charging-stations, from which a supply of gas can at all times be obtained with a minimum of trouble or loss of time. The prevailing opinion seems to be that the roof gas-holder as now used offers on the whole more advantages than any yet proposed system of compressed gas in cylinders. One advantage is the avoidance of extra weight. Experience in Berlin with 3-ton road motors shows an expenditure of 1 cub. metre of gas for 1 kilometre of distance travelled.—*Journal für Gasbeleuchtung*, August 31, 1918.

Chorley Town Council propose to purchase a motor fire engine.

Darlington Town Council are considering the purchase of a motor fire engine.

Buxton Urban District Council are applying for a permit to purchase a steam wagon at a cost of £1,200.

A Merryweather motor fire engine has been presented to the City of Norwich by seventeen local firms, each of whom contributed £100 to the purchase fund. It is a petrol Hatfield engine of 70-horse power, with a capacity of 500 gallons, and a sliding carriage telescopic fire escape of 55 ft.

Gillingham Corporation Works Committee had before them recently the question of motor transport, and a letter from Messrs. Edison Accumulators, Limited, was read, enclosing quotation and specification of an electric motor van of 2 tons carrying capacity, the cost being: Complete chassis, including all accessories and Edison accumulator, and complete set of solid indiarubber tyres as specified, £890; extra increase due to war, 20 per cent, £178—£1,068. Body, £150 to £160. It was resolved to recommend the council to take the necessary action to acquire two electric motor lorries for collecting house refuse.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as "* engineer *" and "* surveyor," *should never be used.*

Water Supply to Isolated Houses.—"L. L. B." writes: In this urban district there is an isolated block of ten cottages to which the water supply of the district cannot be extended. The property is supplied by water from a deep draw well, which gives an inadequate and unsatisfactory supply. Can any action, short of closing the houses (which under present housing conditions is not feasible), or applying for rural powers under the Public Health (Water) Act, 1878, be taken to compel the owner to provide an adequate supply of water?

If the water supply of the district is within a reasonable distance of the cottages, and they can be furnished with a supply at a cost not exceeding the water rate authorised by any local Act in force within the district, or, if there is no local Act in force, at a cost not exceeding 2d. a week, or such other cost as the Local Government Board may determine to be reasonable, the owner can be compelled to obtain a supply, and to do the works necessary for that purpose, under sec. 62 of the Public Health Act, 1875. If, however, the district supply is not within a reasonable distance, the only alternative would appear to be to apply for rural powers under the Act of 1878.

Repair of Retaining Wall Supporting Road.—"Leofric" writes: There is a road in this (rural) district which is supported on one side by a retaining wall, the adjoining land on that side being at a much lower level than the road. In consequence of heavy rains and floods this wall has got into a very ruinous state, and there is a danger of its giving way and carrying part of the road with it. Will you kindly advise me whether the landowner can be compelled to repair it, or whether it is reparable by the council?

Assuming that the road is a public highway reparable by the council, and that the wall is necessary for its support, it is, in my opinion, reparable by them, and not by the landowner. See *Stockport and Macclesfield Highway Board* v. *Grant* (46 L.T., 388).

Housing Schemes.

By PERCY B. HOUGH HOUFTON.*

[*Concluded from last week.*]

We now come to the question of the house itself, which is, or ought to be, the keynote of the housing scheme. We have said that economy in the construction of residential roads is of the utmost importance as it vitally affects the planning of the house. The effect of unnecessarily high street costs in the past has been to squeeze the houses together laterally, and to produce the narrow frontage type of house with long back additions. The crude sanitary arrangements of the day had to be located in detached blocks. I need hardly point out that houses of this kind fail conspicuously in the four essentials of a good house—health, convenience, appearance, and economy. While there will be general agreement on the first three counts, there may be a difference of opinion as regards economy. From my own experience, I am satisfied that the broad-fronted house is the cheaper. Or, to be correct, I should say that for the same cost the broad-fronted house gives a larger effective cubic content. In experiments with broad and narrow types of parlour houses we found that, other things being equal, the broad type gave sufficient extra space for an upstairs bath-room without additional cost. It is not altogether a question of the amount of material used; the economy is due to a saving of labour, in cutting and waste, and in the ease of handling a straightforward job.

It may be of interest to say that I am indebted to my friend Mr. Unwin for rescuing my wide-fronted cottage plan from oblivion. He selected it for the Sheffield Corporation's scheme at High Wincobank. It was a self-contained cottage with through rooms, and afterwards figured in the first Letchworth Exhibition. I have used it in many modified forms since, but it was never really popular with the working housewife until a parlour was added.

The advantage of this type of house generally lies in superior lighting and ventilation, particularly to the living and working rooms, and to the staircase and larder. Another important point is that the greater width allows considerable choice of internal plan, with possibilities of more conveniently arranged rooms and more regard to the right aspect. The living-room and one of the bedrooms, for instance, may be through rooms, with windows at each end. Through rooms are bright and cheerful, easily ventilated, and suitable for any aspect—north, south, east, or west. I can speak with personal appreciation on this point, as I have been living in a house with through rooms for twelve years. The bedrooms especially are a boon in hot weather, and are easily ventilated at all times.

The convenience of a house and the amount of labour required to manage it depends very largely on the internal plan. The position of doors, windows, and fire-places should be carefully considered. The effective size of a room depends not only upon its area, but on its shape and arrangement. In this respect the long through living-room lends itself admirably to the dual purposes of working-room and sitting-room which it has to serve.

A burning question of the moment is the position of the bath—whether, in fact, it should be upstairs or in the scullery, or in an annexe to the scullery or outer lobby. In a mining village in Notts we have put the bath upstairs, with a hot supply from the kitchen range. In this case the arrangement meets with general approval. I am inclined to think that this will be the position most in favour for all houses in the future. But opinions differ, and for a municipal scheme in another mining locality the committee ask for the bath to be in the scullery, in such a position that it can be screened without cutting off access to the doors. For the supply of hot water there is need for a simple, independent gas copper and boiler combined, and it is to be hoped that something of this kind will be forthcoming.

The question of access to the back of the houses is also one on which there is some difference of opinion. The choice presented is that of a back road, houses in pairs with side access, a block of four or six houses with one or two covered archways between, and blocks of four with joint access to the two end houses. Personally, I have found the latter method fairly satisfactory, and it is certainly the most economical. In this plan it is essential to have short fences at right angles to the house, to keep the traffic lines away from doors and windows. The question of back access is important, as it makes a considerable difference to the site-planning.

STANDARDISATION AND VARIETY.

Let me suggest to you a kind of keyboard of cottage units. In a large scheme, perhaps, there will be a few living-room houses, but the bulk will be parlour houses with two, three and four bedrooms—four types in all. When variations in detail have been made for north and south aspects, the four types will become eight. These houses will be of the broad frontage type, or, if I may borrow a technical word, "stretcher" units. The end houses will be narrow, or "header" units, and comprise living room and parlour houses for reverse aspects—four in all. There may also be two types of L-shaped houses to interchange with the "headers," and these I will call "quoins." Standardisation will be secured if the "header," "stretcher," and the main leg of the "quoin" units are all made to a uniform span—17 ft. or 18 ft., as the case may be. The effect of this will be that the roof structure throughout the whole scheme will be uniform, and the eaves, roof pitch, and ridge will line and intersect at all points of contact. At the same time considerable variety will be obtained from the possible permutations of the fourteen units grouped into blocks of two, three, four, five and six houses. Failing some scheme of this kind, it will be necessary either to design separate blocks and to repeat them at intervals or to be prepared with an original treatment for each individual block.

In broad outline, therefore, these are the factors which seem to me to require consideration in the architectural treatment of a large scheme. In the first place, that health and convenience shall be studied in the internal planning. Secondly, that proper regard shall be given to the arrangement of the room to secure the right aspect. Finally, that some adjustment be made to bring order amongst the units, so that broad effects in the grouping of squares, terraces, and street pictures may be built up in a rhythmical way. Architectural appearance does not depend upon elaborate ornamentation, but rather in simplicity of design upon securing the right pitch for the roof, the right proportion and positions for the windows, and the right selection and use of local materials. As regards style, those who follow the Georgian tradition will be right in adding to the dignity and charm of localities where that tradition prevails. On the other hand, picturesque groups of gabled blocks will have their own proper setting on wooded hills and undulating ground, where skyline counts in the composition.

THE LOCAL GOVERNMENT BOARD PLANS.

It is difficult to refrain from saying a word as to the unfortunate set of plans which have been issued as an official Memorandum for the guidance of local authorities. When we consider that these plans are intended to shape the future environment of four or five millions of people, at a cost of a hundred millions of money, one would think that the occasion called for a serious effort to put forward the best and most modern ideas available. As it is, the collection seems to have been made almost with levity, so haphazard and inconvenient is the planning in many cases. Too little regard is given to aspect, back doors open on to baths and kitchen fireplaces, and in two cases there are no fewer than four doors between scullery sink and larder bench. With some experience of the keen interest which women's organisations are taking in this question, I venture to say that local authorities who adopt these plans in their present form are surely laying up for themselves a day of reckoning.

Unfortunately, too, the R.I.B.A. competition cannot be said to have been an unqualified success. The conditions were not well drawn, nor were the types of house required well-thought out, or their positions in the block. A really good collection of plans, prepared with proper regard to the housewife's convenience, to aspect and grouping, has not yet been published.

WHO IS TO BUILD THE NEW HOUSES.

In this respect I think we shall have to rely more and more on municipal action. No one, taking a dispassionate view, can say that the speculative system has given anything but evil results, or that a drastic change is not urgently needed. From my own experience I can say that even well-intentioned private schemes are not always "safe for democracy." The excellent work of legitimate Public Utility Societies will grow, no doubt, and supplement municipal action, and there will be a sphere of usefulness for the private speculator as master builder. The problem is to devise a method which has neither the evils of the speculative system nor the defects of competitive contracts. This is a question for local industrial councils to consider. The solution may lie in some form of co-operation between groups of builders acting for the local authority on equitable terms arranged by negotiation. There are difficulties to be overcome, but it is a question whether the competitive system has not overreached itself, and whether the economies due to the co-operation will not outweigh the economies which competition is supposed to secure.

* From a paper presented at a meeting of the Town Planning Institute.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of Surveyor *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Burgess Hill U.D.C.—The surveyor, Mr. Farrington, has been instructed to carry out the necessary work for converting the stable at the rear of the council offices into a public mortuary.

Cumberland C.C.—A decision has been reached for the reconstruction of Barnghyl Bridge, Distington, at an estimated cost of £590.

Manchester T.C.—The city council have determined by a large majority that the much-discussed "infirmary site" shall be made use of for the erection of a new art gallery.

Newcastle (Co. Down) U.D.C.—The surveyor, Mr. D. M. Gracey, has been instructed to prepare plans for the conversion of the Annesley Arms into a town hall.

ROADS AND MATERIALS.

Barnstaple R.D.C.—Complaint was made that hedges remained uncut and were overhanging the roads to the detriment of their condition, and it was suggested that the county would take stringent measures if the work was not done. It was explained on behalf of the farmers that their position was a very difficult one in view of the shortage of labour. With respect to the state of the roads, which was described as "terrible" in some instances, the surveyor, Mr. A. A. Richards, promised to see the contracts, but he was afraid that under present circumstances, with no men about, there was very little prospect of putting material on the roads.

Derry C.C.—It was stated that the council were making a claim upon the Road Board for damage done to the Derry-Moville road.

Dorset C.C.—The county surveyor, Mr. W. T. Fletcher, has been granted a sum of £200 for extra work carried out in connection with the repair of roads damaged by naval and military traffic. The work would cost £15,570, towards which £12,488 had been received from the Road Board.

Down C.C.—The county surveyor reported that the rate of wages payable by the county council had increased by an average of approximately 98 per cent since 1899. To enable as much work to be done now as was possible under the limit of expenditure then of £63,768 the limit ought to be £126,026. The sum of the extended limit which he now recommended was £96,529, so that at present prices nearly £30,000 worth per year less work would be possible than in 1899, when the wear on roads, owing to the absence of motors, was much less than now. Consequently, it was evident that, unless expenditure was greatly increased, the roads must deteriorate. The secretary was directed to transmit the recommendation to the Local Government Board.

Lurgan R.D.C.—The county surveyor, Mr. R. H. Dorman, advises the rural council to fix the road expenditure for the ensuing year at £7,000, and adds that as the limit of expenditure is £5,237 it will be necessary, should the suggestion be adopted, for the county council to apply to the Local Government Board to increase the limit. The wages of the men, he states, has increased 60 per cent, the cost of horse-work and hauling has about doubled, and the cost of coal has trebled. At their quarterly meeting in February next he would lay before them proposals for the renewal of the existing direct labour scheme for a period of three years from April 1, 1919. The cost of maintaining the roads under the new scheme would, he estimated, amount to about £6,300 a year.

Monaghan U.D.C.—Owing to the difficulty of getting men to work on the roads the council have appointed a committee representing each of the rural districts to confer with the county surveyor, Mr. Hannigan, on the wages question.

North Riding (Yorks) C.C.—Mr. E. R. Turton, M.P., asked what steps were being taken to get a refund for the damage to the roads by the haulage of timber. Some time ago the War Office admitted that this haulage was to the extent of about 95 per cent work of national importance, and he thought it was the duty of the council to represent as strongly as possible that the ratepayers should not be compelled to pay for the repairs. There was, he said, an insidious attempt by the War Office to obtain the control of all bridges and roads in the country, and he could not imagine anything more disastrous to the country roads. Alderman Hawking (chairman of the Highways and Bridges Committee) said that the committee had in the past received considerable grants for damage caused by timber hauling, and they held several letters which would form a basis for negotiation with regard to any future claim. The Road Board had met the committee favourably in the past. With respect to War Office interference in road administration, he would take care that what Mr. Turton had reported was brought to the notice of the committee.

Northumberland C.C.—It was reported that the damage done to main roads by transport of timber for national purposes was estimated two years ago at £32,439, and had gone on increasing very greatly. The Bridges and Roads Committee received an intimation from the War Office that the Government "may make a contribution towards the cost of this damage." A new Transport Board has been formed as a Joint Roads Committee, which, it was believed, would go into the cost of extraordinary traffic. The cost of reconstruction over many miles would be £3,000 per annum, and authority was given to the Roads and Bridges Committee to take up this question with the Joint Roads Committee.

Ramsgate T.C.—A scheme has received approval for widening the west side of King-street, in order to increase the width of the road uniformly to 40 ft.

Redruth U.D.C.—The surveyor, Mr. H. Monson, stated that the cost of the stone produced at the council's quarry at Treleigh was 3s. 1d. per sq. yd. As it was stated that there appeared to be very little stone recovered for the work done it was decided that the stone returns for the past six months should be reported to the Highways Committee.

Shoreham U.D.C.—Attention was drawn to the fact that the Road Board had obtained the services of the surveyor, Mr. A. W. Nye, to undertake certain work at Brighton, and a resolution was moved to the effect that the Road Board be informed that, while pleased to allow the surveyor to assist them within the district, he could not be allowed to undertake work for them outside the urban district. Nothing came of the proposition, however, as after considerable discussion it was allowed to drop.

Truro R.D.C.—A committee has been appointed to consider a scheme for converting the abandoned track of the Redruth-Chacewater railway into a high road.

Warrenpoint (Co. Down) U.D.C.—After considering a report by the surveyor, Mr. P. J. Neary, the council have agreed to ask the Local Government Board to increase the loan for steam-rolling and road improvement by £150, making the total £2,025, one half of which would be borne by the county council.

REFUSE COLLECTION AND DISPOSAL.

Scarborough T.C.—The town council have decided to make use of a site at Gallows Close for the proposed refuse masticator.

SEWERAGE AND SEWAGE DISPOSAL.

Amesbury R.D.C.—Instructions have been given for the preparation of plan and specification for the extension of the sewer main in the Station road, and the chairman and Mr. Tucker have been appointed to obtain tenders for the work and to accept one.

Coventry T.C.—The council have approved the recommendation of the Sewage Farm Committee to purchase a portion of the Baginton estate for £8,185 for the extension of the farm. The land contains seventeen cottages, which will be used for housing the men engaged on the farm.

Crompton U.D.C.—The council have agreed to take up a loan of £7,693 sanctioned by the Public Works Loan Commissioners for the extension of the sewage disposal works at Newhey.

Keynsham R.D.C.—It was reported that at a recent meeting of this council and the Warmley Rural District Council to consider the question of the effluvia arising from the Bath sewage disposal works at Salford it was decided to draw the attention of the Local Government Board to the matter and to request them to hold an inquiry on the spot. The board was further asked to receive a deputation on the subject. The clerk said the Local Government Board had at present declined to receive a deputation; they were in correspondence with the Bath Corporation. The council decided to write to the board emphasising the urgency of the subject, and asking that an inquiry should be held immediately.

WATER, GAS, AND ELECTRICITY.

Amesbury R.D.C.—On account of the unsatisfactory quality of the water supply at Tilshead the military authorities wrote that they proposed to sink a borehole, and they asked the council to bear a portion of the expense to the extent of undertaking the pumping. As it was stated that "if the

military did not interfere with the water supply it would answer all the requirements of the village," it was decided not to make any contribution.

Arklow U.D.C.—Plans are being prepared for the lighting of the town by electricity.

Ashington U.D.C.—The council have resolved to send a deputation to the Local Government Board with a view to securing immediately a loan for the object of laying water mains in order to get a supply of water from Tynemouth Corporation.

Newport (Mon.) T.C.—The town council on Saturday last decided to promote a Bill in Parliament to provide an additional water supply. The construction of the works is estimated to cost over £1,000,000. There will be a reservoir in the Caerffanel Valley, near Talybont, with a capacity of 2,500 million gallons. The pipe line will be 32 miles in length. Water is required for new works to be constructed at Newport.

Northumberland C.C.—With respect to complaints of the water supply in East Northumberland, it was stated that it was the intention of the council to take action when the observations of the water authorities had been received. Authorities, it was stated, should not pay for surplus water at a nominal rate, but share and share alike on proper terms for a full supply.

Reigate T.C.—It is proposed to effect extensions of the electricity output, at an estimated cost of £365.

LOCAL AUTHORITIES AND HOUSING.

BUILDING PROPOSALS.

In reply to a question in the House of Commons, Mr. Stephen Walsh, Parliamentary Secretary to the Local Government Board, stated that the following local authorities had undertaken to build approximately the number of houses specified—namely: 41 county borough councils, 35,256 houses: 70 non-county borough councils, 16,304 houses; 150 urban district councils, 34,306 houses; 93 rural district councils, 13,822 houses; making a total of 99,688. In addition 7 county borough councils, 18 non-county borough councils, 51 urban district councils, and 59 rural district councils had undertaken to build houses, but the number of houses was not determined. The local authorities mentioned had not undertaken to build within a specified period.

Crook Urban District Council are inviting architects to prepare a building scheme for 200 houses.

Dewsbury Town Council have decided to erect working-class houses on the Raven's Lodge estate.

Middlewich Urban District Council have purchased a site at Newton Hall for the erection of houses.

Sowerby Bridge Urban District Council have instructed the surveyor, Mr. J. Eastwood, to submit a scheme for about 200 houses.

Mr. Bonar Law stated in the House of Commons that it was not possible to give a day during the present Session of Parliament for the discussion of the housing policy of the Government.

Flood Damage in Kintyre District.—A rainstorm of exceptional severity and prolonged duration was experienced in the southern portion of Kintyre on the night of the 4th inst. and early morning of the 5th inst. Several bridges and culverts were washed away and road "washouts" occurred. Many other bridges and culverts were undermined and otherwise seriously damaged, while floodings and road blockings by gravel and small land slides were common. The damage, owing to continuation of rainy weather, cannot be fully ascertained, but it must amount to several thousand pounds. Already it is known that four new bridges will require to be built.

Making it Clear.—The position of Mr. Coburn with respect to the surveyorship of the Langport Rural District Council is still undecided. He has filled the post for two years, and is stated to have given every satisfaction, but the council hesitate to stabilise his position until the return of the sanitary inspector, when it is stated the whole question will be gone into. At a recent meeting a proposition was made that Mr. Coburn be appointed surveyor, and a supporter of the motion said that if he were that gentleman he would look out for another job. Mr. Coburn has a right to the appointment, said another speaker. The proposition was eventually withdrawn, and Mr. Coburn was informed by the chairman that he was neither temporary surveyor nor deputy surveyor, but that he was their surveyor, although under present circumstances they desired him to be designated as acting surveyor. When the sanitary inspector returned he should make formal application for the position, and it would be favourably considered.

PERSONAL.

Mr F. J. Voisey, borough surveyor and sanitary inspector of Dartmouth, has had his salary increased from £155 to £175 a year.

Mr. D. F. Milne, principal assistant in the Dundee city engineer's office, in view of the state of his health, has had his official duties modified, and it has been decided to reduce his salary from £345 to £245 a year.

Major J. D. Fettes, Royal Engineers, who was before the war waterworks engineer at Penang, has been awarded the Military Cross. Major Fettes has seen much active service, both in the fighting last March and in the recent offensive.

Mr. John J. Connolly, engineer to Monaghan Rural Council, has been appointed by the Monaghan County Council to the position of assistant county surveyor for Castleblaney rural district, in room of Mr. W. M. Rutherford, now surveyor in Lurgan.

Having regard to the fact that there has been only one South Wales president of the Institution of Municipal and County Engineers during the existence of that body, and that twenty years ago, when the late Mr. Wm. Harpur filled the office, it was unanimously decided at a meeting of the district held on Thursday of last week to nominate Mr. E. J. Elford, city engineer of Cardiff, as a vice-president for the year 1918-19.

OBITUARY.

Mr. James Bray, advisory surveyor to the St. Thomas Rural District Council since 1866, died recently, we regret to state. He was formerly surveyor to the Wonford Highway Board, and subsequently to the St. Thomas Rural District Council.

RESTRICTIONS ON MANUFACTURERS.

EARLY RELAXATION PROMISED.

The Minister of Munitions gives notice that orders and instructions are in course of preparation, and will be published shortly, under which the restrictions which have hitherto existed prohibiting manufacturers from undertaking certain classes of orders and from using certain materials otherwise than for specified purposes will be relaxed so far as possible.

Croydon Town Planning Scheme.—The Croydon Town Council at their last meeting agreed to apply for authority to prepare a town-planning scheme for an area to be known as the Croydon (South) Town Planning area, such area being about 1,160 acres in extent. Of this area about 840 acres are in the borough and 320 in Beddington.

The "Swan" Pen.—In these days of soaring prices it is refreshing to discover that half a guinea will still purchase a fountain pen of the excellent "Swan" make. This is a fact that will appeal to the many who in a few weeks' time will be faced with the problem of selecting Christmas and New Year gifts, and it is not too much to say that there are few more useful or acceptable presents. The "Swan" has long since proved its reliability. It is unsurpassed in workmanship, and with ordinary care will last for years without a change of nib. It is a real time-saver, and no business man should be without one.

FOR OTHER ADVERTISEMENTS
See End of Paper.

LANDER FOREMAN WANTED, for the duration of the war, with experience in maintenance and cleansing of roads and appliances for same, and maintenance and construction of sewers. Also required to manage heating apparatus of large elementary school. Wages £3 per week.—Apply, stating age and experience, with two recent testimonials, to the Borough Surveyor, Maidstone. (3,914)

COUNTY BOROUGH OF BARROW-IN-FURNESS.
TEMPORARY ENGINEERING ASSISTANT.

Wanted in the Borough Engineer and Surveyor's Office, a temporary Engineering Assistant. Applications, in candidate's own handwriting, stating age and salary required, and giving full particulars as to experience, and accompanied by copies of not more than three recent testimonials, to be sent to the undersigned not later than twelve o'clock noon, on Monday, the 25th November, 1918.

Canvassing will disqualify.

W. C. PERSEY,
Borough Engineer and Surveyor.

Town Hall, Barrow-in-Furness.
November 12, 1918. (3,912)

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

ROLLER DRIVER.—November 19th.—Abergavenny Town Council. 30s. per week, with 20s. war bonus.—The Town Clerk, Town Hall, Abergavenny.

SURVEYOR.—November 23rd.—St. Neots Urban District Council.—Mr. T. Spencer, clerk, Council Offices, Market-square, St. Neots, Hunts.

TEMPORARY ENGINEERING ASSISTANT.—November 25th.—Barrow-in-Furness Town Council.—Mr. W. C. Persey, borough engineer and surveyor, Town Hall, Barrow-in-Furness.

ROAD AND GENERAL FOREMAN.—November 25th.—King's Lynn Town Council.—Mr. Raymond A. Newstead, borough surveyor, Town Hall, King's Lynn.

DRAUGHTSMAN.—Gold Coast Government Railway. £350—£400, with £60 war bonus.—Crown Agent for the Colonies, 4 Millbank, S.W. 1.

WATER INSPECTOR AND WATERWORKS FITTER.—Chichester City Council.—The City and Water Engineer, Chichester.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

BRISTOL.—November 22nd.—For the reconstruction of the single-floor transit shed at Avonmouth Dock.—Mr. T. A. Pease, engineer, Dock Engineer's Office, Avonmouth Docks, Bristol.

Engineering: Iron and Steel.

WARRINGTON.—November 19th.—For the supply of under-feed mechanical stokers.—Mr. F. V. L. Mathias, borough electrical and tramways engineer, Howley, Warrington.

MANCHESTER.—November 29th.—For the supply and erection of three-phase, 6,600 volt sub-station switch gear at any sub-station in the supply area.—Mr. F. E. Hughes, secretary, Electricity Department, Town Hall, Manchester.

WARE.—December 2nd.—For the supply and fixing of a "Permutat" water-softening apparatus.—Mr. G. H. Gisby, clerk, Union Offices, Ware, Herts.

WALSALL.—December 5th.—For the supply and erection of one 500-kw. rotary converter equipment for tramways supply.—Mr. H. A. Howie, manager, Electricity Department, Wolverhampton-street, Walsall.

Roads.

CAMBS.—November 20th.—For the supply of broken granite, basalt, slag and tarred macadam.—The Clerk, Cambridge County Council, County Hall, Cambridge.

GLANFORD BRIGG.—November 25th.—For the hire or purchase of two second-hand 6-ton trailer wagons.—Mr. C. A. Howard, highway surveyor, Brigg.

CHELMSFORD.—December 2nd.—For the supply of about 500 tons of Guernsey, Penmaenmawr or Leicester granite broken to 2-in. or 1½-in. gauge, and ¾-in., ½-in., and ¼-in. granite chippings.—The Borough Engineer, Municipal Offices, Chelmsford.

Sanitary.

TADCASTER.—November 28th.—For works and materials required in the excavation and laying of 160 yds. of 9-in. earthenware pipe sewer and manholes.—Mr. H. C. Wood, sanitary surveyor, Tadcaster.

Stores.

WEST HARTLEPOOL.—November 18th.—For the supply of concrete kerbstones, flags, scoriæ and whinstone channel blocks and paving setts, hand, machine and unbroken whinstone, pitch, tar and lime.—Mr. Nelson F. Dennis, borough engineer and surveyor, Municipal Buildings, West Hartlepool.

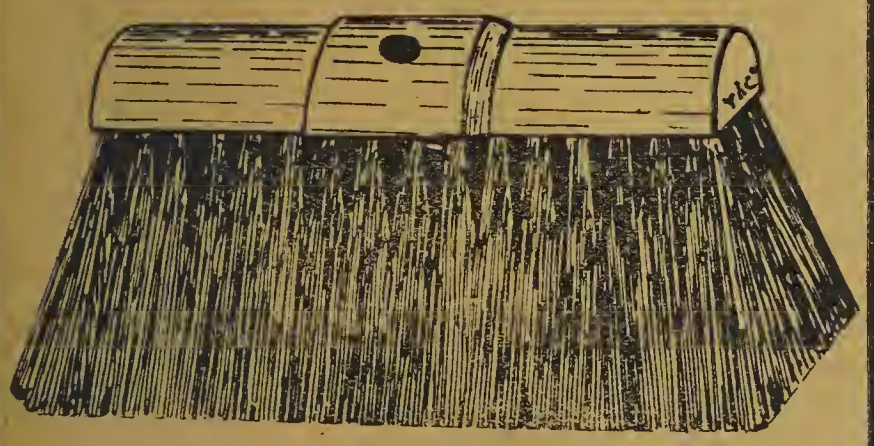
KING'S LYNN.—November 20th.—For the supply of coal, oilman's goods, ironmongery, waste and packing, brushes,

YATES & CO.,

BOOTHTOWN, HALIFAX

(Established 1857.)

BASS BROOMS.



Prices and samples of Plain and Scavenger Pattern in Pure African, Pure Bahia, African and Bahia and Cane and African mixed, will be gladly sent on application.

ROTARY BROOMS SUPPLIED
AND OLD
ROTARY BROOMS RE-FILLED

NO CONNECTION WITH ANY OTHER FIRM OF SIMILAR NAME

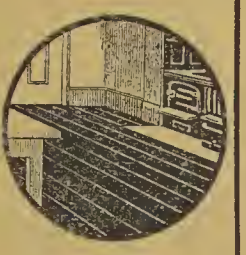
This one simple Paint System covers all your Housing Scheme Needs

CONVENIENCE, efficiency, and economy are 3 things most needed in painting the Nation's new houses. Adoption of a uniform painting system based on standardised, simple, but irreproachable paints offered specially for Housing needs will achieve all 3. The Berger Housing Paints are the **only** paints so offered. They are **convenient**—because all surfaces are covered by 3 paints only, and because they are consistent in quality and colour throughout the Kingdom; **Efficient**—because their efficiency is necessary to maintain our 158 years' reputation; **Economical**—for they are the best paints we can make, and the best is cheapest because it cuts out repainting labour.

Pompeian Paint, ready for use in 16 colours for outside and inside woodwork.

For outside and inside woodwork.

For inside walls.



For floors.

Matone, washable flat wall paint in heavy liquid form in 27 colours for inside walls.

Lustro varnish stain in 7 wood effects, for floors, &c.

Write for comprehensive colour folder and particulars of

Berger Paints

for Housing schemes

Lewis Berger & Sons, Ltd.,
Makers of Colours, Paints, & Varnishes,
HOMERTON, LONDON, E.9.
Established 1760.

castings, disinfectants, stoneware pipes, timber and plumber's work.—Mr. Raymond A. Newstead, borough surveyor, Town Hall, King's Lynn.

BRADFORD.—November 23rd.—For the supply of articles for the Tramways Committee.—Mr. R. H. Wilkinson, tramways general manager, 7 Hall Ings, Bradford.

NOTTINGHAM.—November 28th.—For the supply of cement, blue lias lime, red brick, blue bricks, timber, stoneware pipes, iron castings, iron gullies, York flags, kerb, granite setts, broken granite, ironstone slag, chippings, river gravel, picks, shovels, scoops, coal, ironmongery, scavenging and other brushes, disinfectants, refined tar, pitch and creosote oil.—Mr. Arthur Brown, city engineer, Guildhall, Nottingham.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

DECEMBER.

13.—Institution of Water Engineers: Winter General Meeting, Burlington House, London. 2.15 p.m.

APPOINTMENTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

BOROUGH OF KING'S LYNN.

The Corporation invite applications for the post of Road and General Foreman. Applications, in candidate's own handwriting, stating age and qualifications, together with salary required, and enclosing copies of three recent testimonials, must be delivered to the undersigned not later than 10 a.m., Monday, 25th November, 1918.

RAYMOND A. NEWSTEAD,
Borough Surveyor.

Town Hall, King's Lynn.
November 13, 1918. (3,911)

WATER INSPECTOR AND GENERAL WATER-WORKS FITTER wanted by the Chichester City Council.—Apply, stating age and wages, to City and Water Engineer, Chichester. (3,910)

TENDERS WANTED.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

CAMBRIDGESHIRE COUNTY COUNCIL.
TENDERS FOR ROAD MATERIAL.

The above Council invite Tenders for the Supply of Broken Granite, Basalt, Slag, and Tarred Macadam for use on the main roads during the year ending March 31st, 1920.

Particulars and Forms of Tender may be obtained from this Office, where Tenders are to be delivered on or before Wednesday, November 20th, 1918.

County Hall, Cambridge. (3,905)

BOROUGH OF KING'S LYNN.

The Corporation invite Tenders for the Supply during the twelve months ending 31st December, 1919, of the following:—

Coal, Oilman's Goods, Ironmongery,
Waste and Packing, Brushes, Castings, Disinfectants,
Stoneware Pipes, Timber, Plumber's Work.

Forms of Tender and further particulars can be obtained, and Samples may be seen, on application to the undersigned, to whom Tenders must be delivered not later than 10 a.m. Wednesday, November 20th, 1918.

The Corporation does not bind itself to accept the lowest or any Tender.

RAYMOND A. NEWSTEAD,
Borough Surveyor.

Town Hall, King's Lynn.
November 1, 1918. (3,906)

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH
EXPANDED METAL.

EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length. 1 mile; total width of Roadway, 65 feet.
Mr. SAMUEL HUTTON, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED
(Patentees and Manufacturers of Expanded Metal).
Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.
Works: STRANTON WORKS, WEST HARTLEPOOL.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. NOVEMBER 22, 1918. No. 1,401.

Minutes of Proceedings.

The Surveyors' Institution.

Those of our readers who are members of the Surveyors' Institution will, we are confident, join with us in offering cordial congratulations to Mr. J. H. Oakley on his accession to the presidency and on the auspicious conditions under which his year of office has opened. Mr. Oakley can claim a double distinction in assuming the office, being not only the youngest president which the institution has had, but also the first occupant of the chair who has become qualified by the regular course of examinations. The present year is the fiftieth in the history of the institution, and it was only natural therefore that the presidential address should have taken the form of a sketch of its activities from the time of its foundation in 1868. Mr. Oakley dealt in turn with the three main objects which the founders had in view—namely, intellectual advancement, improved status, and the fostering of a high standard of professional conduct. With regard to the first heading, it is interesting to observe that the Surveyors' Institution was a pioneer in the matter of qualification by examination, their example in this respect being followed later by engineers, architects, accountants and others. The examinations have made remarkable progress, both as regards the number of candidates and the efficiency of the test, and they are now recognised by several Government departments. The improved status which the profession has attained, largely owing to the efforts of the institution, is shown by the statutory recognition accorded under several Acts of Parliament from 1878 onwards. As an example we may mention the Finance (1909-10) Act, 1910, under which the president of the institution was associated with the Lord Chief Justice and the Master of the Rolls to draw up a panel of referees composed of members of the institution or other qualified persons to hear appeals under the Act, and the Defence of the Realm (Acquisition of Land) Act, 1916, which followed the precedent of the 1910 measure. Finally, with regard to professional conduct, much has been accomplished by the institution towards inspiring public confidence. In this connection Mr. Oakley recalled the story of a surveyor who, on being asked if he were not "concerned" for his client, replied, "I am employed by him, but not concerned for him." History does not relate what the client thought of the reply!

* * * *

The Proposed Trunk Roads.

Opinion in the North and North-West of England seems to be shaping itself strongly in favour of some such scheme as that of the trunk motor road to which allusion was made in this column last week. In the *Manchester Sunday Chronicle* Mr. E. Jennings, of Liverpool, makes his contribution to the discussion with a letter in which he emphasises the necessity for making provision for the great increase of motor-lorry traffic that will mark the post-war period between the manufacturing town and the great ports. It is evident, he thinks, that the existing highways will not be able to stand the strain of this traffic without great alterations, both in regard to the width of the roads and their condition. Bearing this in mind, and also the enormous cost that would be involved in widening the existing roads, he argues that the remedy obviously is to be found in the construction by the Road Board of trunk motor highways of not less than 120 ft. in width, with the least number of gradients possible, by the most direct routes between the most important centres. This, he thinks, would be the best use for the £6,000,000 which it is estimated will be required for repairing the existing roads, and he adds that there must be thousands of men coming home from the Front who will have become efficient road makers now. The proposal to divert money for the repair of existing roads will hardly be entertained considering how necessary this outlay has become; but as regards the scheme for motor trunk roads the Government might be invited to make a special grant as a vital step in the essential process of reconstruction.

* * * *

Salaries in Ireland.

If further proof were needed of the extraordinary view taken by certain members of county councils in Ireland with regard to the value of the services of the assistant surveyors to those bodies; it is afforded by a discussion which took place at a recent meeting of the Neath County Council. At present these officials receive salaries ranging from £100 to £120 a year with war bonuses of a little over £30 in addition, and it appears that they have had the temerity to ask for an increase, a request which the Finance Committee recommended the council to refuse. One member of the council moved that the report of the committee be referred back for further consideration, and in doing so referred to the assistant surveyors as professional men; whereupon a Mr. P. J. Kennedy rose and in the course of a speech against the motion cast doubt upon the accuracy of this description, and proceeded to say that an assistant surveyor was "a kind of overseer," and was in the position of "a steward to the county council." The use of such expressions reveals a total incapacity to appreciate either the nature of a surveyor's work or the qualifications that are required for its proper discharge. As the county council rejected the motion for a reference back by a large majority, we can only assume that they were in agreement with Mr. Kennedy's views. We suggest for their consideration that next time an appointment is to be made they should advertise for "a kind of overseer" and not for an assistant surveyor. If the former is not what they really want, it is at least what they deserve.

* * * *

Demobilisation.

We are glad to observe that in the circular recently issued by the President of the Local Government Board on the resettlement of labour on demobilisation, he specifically refrains from suggesting that the execution of public works by local authorities should be initiated with the primary object or for the sole purpose of mitigating unemployment. With this reservation we are in cordial agreement with the proposal to establish an effective *liaison* between local authorities, who must in any event be large employers of labour, and the local advisory committees established to deal with the general question of the resettlement of labour when the Army is disbanded. We further agree that it is highly desirable that local authorities should have their schemes, where possible, prepared well in advance. The circular, however, goes further than this, and suggests that an effort should be made actually to place post-war contracts in advance, the contracts being arranged, if necessary, at provisional prices to be adjusted later according to revised estimates of the cost of labour, materials, and other things, or, as an alternative, on a profit basis. We very much doubt whether many local authorities will be prepared to commit themselves in this way to uncertain financial obligations, and we venture to hope, in any case, that the expensive system of the payment to contractors of a percentage profit on prime cost will not be generally adopted.

* * * *

Roads and Victory.

It is difficult to speak too highly of the really magnificent work accomplished in France by Brigadier-General Maybury and the gallant officers and men who were privileged to serve under him in connection with the roads in France and Belgium. Although it can hardly be expected that the general public will ever appreciate this work at its true value, those municipal engineers who have been engaged in it will at least have some reward in the knowledge that their professional brethren at least realise the superhuman efforts they have made and the wonderful results they have achieved.

An interesting tribute, too, has come from a rather unexpected quarter. It is fairly well known that a good many Indians have been engaged in transport work behind the lines on the Western Front, and one of the Indian editors now visiting this country as the guests of the Government has recently returned from the scene of their operations. This gentleman, in the course of an interview, described the quickness with which roads were mended as being nothing short of miraculous. Indeed, he had seen tanks and heavy lorries passing comfortably over roads that twelve hours before were under shell fire and full of deep craters. It gives us the greatest possible pleasure to give publicity to this expression of appreciation by an independent eye-witness.

* * * *

London's Water. Since writing our note on the purity of the water supply of the metropolis apropos of Mr. Perrin's report to the Local Government Board, a correspondent has called our attention to the fact that, although the water may be pure *in the mains*, it may not in many instances be in the same condition when drawn from the tap *in the house*. This arises from the absolute requirement of the regulations of the Metropolitan Water Board that all premises shall be provided with a storage cistern. Now, the provision of a storage cistern is not only contrary to the most modern ideas of good sanitation, but the requirement as regards the metropolis is almost wholly gratuitous, in as much as 99·1 per cent of the premises concerned are provided with a constant supply. In view of the facts stated by our correspondent, it would certainly appear to be a pity that the storage cistern should continue to be a possible obstacle to the conveyance of the water from the mains to the houses in its pure state—at all events in those cases where there is no separate tap giving a direct supply from the main.

PUBLIC WORKS.

LOCAL AUTHORITIES AND THE RESETTLEMENT OF LABOUR.

The President of the Local Government Board has issued to local authorities a circular in which he invites them to co-operate with the local advisory committees established to deal with the resettlement of labour on demobilisation. Apart (says the document) from their general interest in questions of reconstruction, local authorities, as both direct and indirect employers of labour, are intimately concerned in the distribution of labour during the period succeeding the cessation of hostilities, and their knowledge of their own requirements and of the works, both of a public and of a private character, which are likely to be undertaken within their area after the war, will, if placed at the disposal of the local advisory committees, be invaluable to those bodies in their investigation of the industrial needs and conditions of their areas.

The circular impresses upon local authorities the advantage both to themselves and to the community of preparing a careful programme of public works which could usefully be put in hand as soon as the requisite materials and labour are available and the existing restrictions on capital expenditure are removed. It is not suggested that the execution of public works should be initiated with the primary object or for the sole purpose of mitigating unemployment. But should the conditions be such as to necessitate the restriction of public works, local authorities which are ready with their plans would naturally have an advantage over those who have made insufficient preparations. If there should be at the same time an opportunity for carrying out works of this nature and an excess of unemployed labour which could be utilised for such works, it would be to the national advantage that they should be put in hand with the least possible delay. In either event it is desirable that the local authorities should have their schemes for post-war work prepared and ready in advance.

It is suggested that an effort should be made to place post-war contracts in advance, the contracts being arranged, if necessary, at provisional prices to be adjusted later according to revised estimates of the cost of labour, materials, and other things, or, as an alternative, on a profit basis.

North Midlands and the National Electricity Scheme.—The report of the committee appointed by the Board of Trade to consider the question of electric power supply, which recommended the establishment of central generating and distributing stations for large areas, is engaging the attention of local authorities in the North Midlands. The Nottingham, Derby, Leicester, Burton-on-Trent, and other neighbouring corporations propose to unite in engaging electrical engineers to advise as to the most suitable area and the best arrangements which can be adopted for securing the most economical supply of electricity in the district. The cost of the services of the experts is to be defrayed by the authorities in proportion to their respective rateable values.

WATER POWER.

BOMBAY'S HUGE STORAGE LAKES.

In a paper presented at the last meeting of the Institution of Civil Engineers, Mr. R. B. Joyner, M.INST.C.E., describes large works—known as the Tata—for supplying Bombay with water-power for its numerous mills and factories, which have hitherto used steam-power, to the extent of over 100,000 horse-power. Coal in most of India is too expensive to allow competition with other countries for many products, though the raw materials are grown, or are found, in India, and labour is cheap and docile, while highly educated Indians abound. To Bombay coal has mostly to be carried about 1,200 miles.

The water-power now provided is very much cheaper than power from coal or oil, gives a better "drive," and frees Bombay from the clouds of deleterious smoke which the poor Indian coal gives.

The works described take advantage of the remarkable circumstances of the very heavy rainfall on the precipitous edge of the Western Ghats, about 2,000 ft. above and about 40 miles from Bombay. As the rain falls only during three or four months of the year and the watercourses are dry all the rest of the year, it was necessary to store water sufficient to give about 100,000 horse-power for ten or twelve hours a day during about nine months of the year.

Three lakes are formed by four masonry dams, ranging from nearly ¾ mile long and 34½ ft. high to nearly 1½ miles long and 96 ft. high. Two of these form a "monsoon" lake of sufficient capacity to provide power during the longest "breaks" in the monsoon, and thus give an uninterrupted supply of power for three months and more. The other lakes are for storage and maintain the power during the eight or nine months in the year when no rain falls.

The combined available capacities of the two storage lakes is about 10,100 million cub. ft., whilst the water required to give 100,000 horse-power ex turbines for nine months, allowing for the great loss by evaporation and by soakage and for friction in the pipes and turbines, is 6,700 million cub. ft. The excess capacity is given owing to the very variable amounts of the monsoon rains, so as to carry on the balances in years of excessive rainfall to make up for the occasional short monsoons. It was arrived at by assuming the works had been completed forty years ago, there being one rain-gauge record covering that period—which includes four minimum years' fall—and deducting from each year's supply the amount which would have been used, lost by evaporation, run to waste, or carried on to the next year, which gives the excess capacity required for a sufficient number of years.

THE LARGEST MASONRY DAM.

The works are notable for the following reasons:—They are the largest of the many similar hydro-electric works which have been constructed during the past ten or twenty years, taking into consideration the great head used combined with the large discharge of water. The first is equal to about five times the height of St. Paul's Cross, and the latter is greater than the summer flow of the River Thames during five months. They are also the first works to store water for power for use during about three-fourths of the year. One of the masonry dams, taking the exposed face area, is probably the largest yet constructed. The works are probably unique, considering the very heavy rainfall and the very steep, rocky slopes, giving the greatest discharge perhaps ever recorded. The catchment-area of the two lakes is only 16½ sq. miles, while of this the full lakes area is about 7½ sq. miles.

The water is led from the monsoon lake and from the two storage lakes, which are joined together by a tunnel a mile long, by two ducts, together 4·63 miles long, to the forebay at the top of the great precipitous scarp which forms the western boundary at the Deccan plateau. From there the two lines of steel pipes are taken down the steep slopes and precipices to the power-house, about 1,750 ft. below the forebay, the length of single line being about 2·33 miles. The pipes at the top are 82½ in. in internal diameter, and at about two-thirds of the total height down the diameter is 72 in. Here they are joined by a double swan-neck pipe, from which eight smaller pipes are led down to the power-house, their diameter being 3½ ft. at the top and 3 ft. 2 in. at the bottom. The thickness of the metal at the top of the large pipes is ⅜ in., and at the bottom of the small pipes 1¼ in.

PORTLAND CEMENT IN MASONRY DAM CONSTRUCTION.

The question of the desirability of using Portland cement for masonry dams is raised in the paper. It is never done in India. To build dams there with Portland cement would render such works financially impossible, and hydraulic lime mortar is also considered to be better adapted for the purpose.

America and the Metric System.—The international High Commission has recommended the more extensive use of the metric system in the trade and commerce of the United States, as it would be productive of great advantage in the commercial relations of the United States with the other American Republics.

The Provision of Working-Class Dwellings.

LOCAL GOVERNMENT BOARDS' COMMITTEE'S REPORT AND RECOMMENDATIONS.

The latest addition to the literature of housing is the report —issued last week (price 1s.)—of the committee appointed by the Local Government Boards of England and Wales and Scotland "to consider questions of building construction in connection with the provision of dwellings for the working classes and report upon methods of securing economy and dispatch in the provision of such dwellings." The whole housing problem is discussed, both in its broader aspects and in detail, and the committee submit a large number of recommendations dealing with the provision of land, the selection, lay-out, and development of sites, the types of houses to be constructed, the materials to be used, and the accommodation to be provided in, and the fitting up of, the dwellings. Important proposals are made with regard to the organisation and execution of schemes in connection with which, it is suggested, the Government should afford active assistance. It is, in fact, to effective control and co-ordination of efforts by a strong central department that the committee look for real progress, and they suggest further that district State Commissioners should be appointed to supervise local schemes and encourage and assist housing enterprises generally. The members of the committee are: Sir John Tudor Walters, M.P. (chairman), Sir Charles Allom, Sir Frank Baines, Mr. James Boyton, M.P. Mr. William Fairley, M.INST.C.E., Mr. G. Marlow Reed, Mr. J. Walker Smith, M.INST.C.E., Mr. James Squires, Mr. Raymond Unwin, F.R.I.B.A., and Sir Aston Webb, and among those who gave evidence before or supplied expert information to the committee are Messrs. J. H. Brierley, ASSOC.M.INST.C.E., borough surveyor, Richmond, Surrey; J. A. Brodie, M.INST.C.E., city engineer, Liverpool; J. Bryce, M.INST.C.E., deputy city engineer, Glasgow; and A. E. Collins, M.INST.C.E., city engineer, Norwich (representing the Institution of Municipal and County Engineers); F. W. Pearce, F.S.I., surveyor to the Twickenham Urban District Council; D. Ronald, engineering inspector, Local Government Board for Scotland; J. Thomson, F.R.I.B.A., city architect and engineer, Dundee; G. Bruce Tomes, ASSOC.M.INST.C.E., surveyor to the Barnes Urban District Council; F. W. Bricknell, M.INST.C.E., city engineer, Hull; J. W. Cockrill, M.INST.C.E., A.R.I.B.A., borough surveyor and architect, Great Yarmouth; D. M. Jenkins, ASSOC.M.INST.C.E., borough engineer and surveyor, Neath; J. Julian, B.E., borough engineer and surveyor, Cambridge; W. T. Lancashire, M.INST.C.E., city engineer and surveyor, Leeds; E. J. Lovegrove, M.INST.C.E., borough engineer and surveyor, Hornsey; F. I. Morgan, ASSOC.M.INST.C.E., acting city engineer, Newcastle-upon-Tyne; J. Paton, borough engineer and surveyor, Plymouth; H. A. Purchase, building surveyor, Birmingham; and W. E. Riley, M.INST.C.E., F.R.I.B.A., superintending architect to the London County Council.

SHORTAGE OF 500,000 HOUSES.

The committee commenced by stating that at a moderate estimate the present need for working-class accommodation in England and Wales and Scotland is at least 500,000 houses. An examination of the figures over a period of years shows that, to meet the housing requirements of the normal increase in population and to take the place of houses demolished, an annual supply of at least 100,000 new houses is needed. It will therefore be seen that the leeway of 500,000 houses has to be made up in addition to the ordinary demand of 100,000 per annum. In the past housing accommodation has been provided almost entirely by private enterprise. For several years prior to the outbreak of war the supply had ceased to meet the demand, and the present shortage is a pre-war as well as a war problem.

"It is quite evident," the committee observe, "that special remedies are needed to deal with the acute housing difficulties that have arisen. The local authorities have expressed their willingness to prepare schemes, subject to substantial financial assistance from the State, for about 150,000 houses in England and Wales, and 98,540 houses in Scotland. The proposals for affording State assistance to local authorities in the matter of housing have been issued, but it is premature as yet to forecast the extent to which such authorities will be induced by such proposals to prepare and carry out housing schemes. It is certain that a very large proportion of working-class housing will still depend upon private enterprise of one kind or another, either that of public utility societies or speculative building.

"If there is no co-ordination of these various building activities the result will probably be that in some districts, where local authorities are energetic, a supply of houses will be forthcoming. In others, where they are supine, very little will be done, and the smaller authorities, without some scheme of federating adjacent and inter-dependent areas, will probably do nothing. Rural housing is certain to be neglected, because of the difficulty of creating a sufficiently strong local opinion to make the authorities act. Private enterprise, owing to high prices and the difficulty of securing labour and materials, is not likely, unless special facilities are afforded, to undertake house building for the first two or three years after the declaration of peace, until conditions become normal and the effect of the experiments in housing by local authorities can be ascertained. A careful review of these circumstances suggests that without some dynamic force it is unlikely that the 1905 standard of 100,000 houses per annum will be reached and little or nothing done to recover the shortage of 500,000 houses."

LOCAL COMMISSIONERS UNDER CENTRAL CONTROL.

In order to meet the present circumstances it is suggested by the committee that the limited compulsory powers of the two boards should be revised and strengthened. The view is expressed that the problem cannot be adequately dealt with unless the housing departments are able to bring within their purview the entire housing requirements of the community, and are enabled to supervise and co-ordinate the housing work of both local authorities and private enterprise. A complete survey of the housing requirements of the country should be taken and periodically revised.

"To achieve these ends," the report proceeds, "a strong housing department, with an experienced and capable chief, should be created both at the Local Government Board for England and Wales and at the Local Government Board for Scotland. If the country were divided into districts and local commissioners appointed working under the central control, but with executive powers vested in them, the problem could be dealt with more effectively and with greater despatch. These commissioners should be men with technical knowledge and experience in housing, and acquainted with modern methods of town planning and development. Their functions should be to encourage and assist local building and primarily to secure effective co-ordination between the various local authorities, public utility societies, and other forms of private enterprise. They should be given considerable discretionary powers with respect to building by-laws. They could advise upon the grouping of small authorities and assist in the preparation of joint schemes. The problem of rural housing requires special treatment; the responsibilities of the various authorities should be defined, and these responsibilities translated into obligations."

With respect to large towns, the committee regard it as most desirable to avoid further overcrowding in the built-up areas, and urge that the new schemes should be provided in the outskirts, and that the first step in this direction is to speed up the town-planning schemes, coupled with foresight in tramway extension and other means of transit.

CONTRACTS AND PRICES.

Reference is made in the report to the methods that should be adopted in arranging contracts and prices for municipal building schemes, the committee observing that whether the method adopted is that of tendering or of the distribution of work among local builders upon a schedule of prices, or a combination of both, it is very desirable that there should be some uniformity of methods applied by the local authorities and a free interchange of opinion between them so that the experience gained may be available for all.

SUPPLY OF MATERIALS AND LAND ACQUISITION.

The committee recognise that the supply of materials constitutes a very formidable problem, and consider that in any priority schemes that are set up by the Government a privileged position must be given to housing schemes.

Discussing the delays that are likely to arise by reason of difficulties connected with the acquisition of suitable land, the opinion is expressed that the possession by local authorities of a simple and expeditious method of compulsory acquisition would render the task of negotiation much easier, and the suggestion put forward that special powers might with advantage be vested in the housing departments for a limited period of years until the general powers of local authorities as to land acquisition can be resettled upon a more satisfactory basis.

PLANNING AND CONSTRUCTION.

The committee took a great deal of evidence upon the planning and construction of workmen's dwellings, so as to secure the fullest economy, while giving the maximum of accommodation and convenience, and their conclusions are set out at length in the report, illustrated by plans and diagrams. The methods of construction and materials to be used in house building have also been the subject of very careful investiga-

tions, with a view to gaining the fullest advantage from the experience of special construction during the war, and also to providing substitutes for such materials as may be scarce and consequently dear on the resumption of building operations. Inquiries have also been made to secure if possible the fuller use of local materials in building, so as to reduce the expense of transit, and so harmonise cottage building with its surroundings.

THE COMMITTEE'S RECOMMENDATIONS.

The recommendations of the committee are too numerous and lengthy to reproduce fully in the limited space at our disposal, but some of the more important may be outlined. It is remarked that certain statutes, local Acts and by-laws relating to streets and buildings needlessly hamper progress, and the committee advocate that greater freedom in employing new methods of construction and lay-out should be permitted. Sites should be selected only after full consideration of possible future developments, transit facilities and suitability of sub-soil. Rural houses, it is suggested, should as far as practicable be built in villages or groups. The number of houses should not exceed twelve to the acre in urban and eight to the acre in rural areas, and a distance of 70 ft. between facing rows of houses should be regarded as the minimum spacing. In the latter connection the committee express the view that with the distribution of population, resulting from the density of building recommended, carriageways and footways narrower in width than usually adopted in urban areas will be adequate, and should be used for roads not required to carry through traffic. There appears to the committee to be no economy in the construction of tenements or two-storey flatted houses as compared with self-contained cottages to justify their adoption on that ground, but in certain Scottish cities and in exceptional positions in other large towns custom and local conditions might render their adoption necessary to a limited extent. The opinion of the committee is that the self-contained, two-storey cottage should generally be adopted as the type to be erected.

L.G.B. URGES PREPARATION OF HOUSING SCHEMES.

In a circular to local authorities the Local Government Board state that the question of housing, apart from its vital importance in relation to public health, must now be regarded as of extreme urgency in view of the cessation of hostilities and the problems which will arise in connection with demobilisation and the setting free of labour and materials for civil purposes. It is therefore regarded as essential that immediate steps should be taken to submit all housing schemes to the board at the earliest possible date, and that every endeavour should be made to push on with their preparation. If, as is no doubt the case in many instances, the local authority are suffering from shortage of staff owing to enlistment, the board recommend that they should at once forward a list of those officers whose prompt return is necessary for effectually expediting the schemes, with their full names, rank, regiment, and official numbers, and the post which each holds under the council. The president will then do his best to secure the early return of these men.

Local authorities are already aware of the nature and extent of the financial assistance offered by the Government, and the president reminds them of the statement made, with the authority of the Government, that the discretion vested in him is to be exercised generously. He adds that he will certainly be disposed to exercise that discretion liberally in the case of those local authorities who recognise the national gain which will accrue from an early submission of suitable schemes. The process of demobilisation may be expected to release a considerable amount of labour which can be utilised with advantage in putting the schemes promptly into execution.

Regarding the suggestions that have been made from various quarters that local authorities are not making sufficient progress with the submission of their schemes for housing after the war, the president states that whilst he is fully alive to the difficulties which local authorities have had to encounter in the past, he feels that, looking to the present position as regards the war, he must now press to know the precise intentions of each local authority in regard to this matter, and how far he can count upon them to provide the houses which it will be necessary to erect at the conclusion of the war. So far as public utility societies, employers, landowners or other forms of private enterprise may prove willing to provide some of these houses at an early date, the necessity for action by the local authority would be reduced, but it would be well to realise that these agencies may not be able to do much in the early stages of demobilisation, and may not therefore be effective in meeting the demand which may arise for the immediate putting in hand of schemes. It is essential that the president should be in a position to advise the Government as to whether the local authorities can be relied upon to provide the necessary houses or whether other measures must be taken to ensure their provision. Sir Auckland Geddes accordingly asks to be furnished with replies to the following questions at the earliest possible date:—

(1) Are the local authority prepared to provide any necessary houses for the working classes for their district, so far as not otherwise provided at an early date?

(2) Are they prepared to do so on the terms set out in the board's circular of the 18th March last?

(3) When will their scheme or schemes be ready for submission to the board with the particulars asked for in the circular above referred to, and for how many houses will they provide?

(4) Have the necessary sites been—(*a*) Selected? (*b*) Acquired?

(5) Is there any work such as the development of the housing sites and the construction of roads, sewers, &c., which can be put in hand immediately when demobilisation begins, without waiting for the final approval of the plans of the houses?

SCHEMES FOR SCOTTISH RURAL AREAS.

A considerable number of local authorities in Scottish rural areas have signified their intention to proceed with the preparation of housing schemes. These include:—Leaside district of Aberdeenshire, 42 houses; Garioch district of Aberdeenshire, 36 houses; Laurencekirk district of Kincardineshire, 18 houses; St. Cyrus district of Kincardineshire, 50 houses; upper district of Renfrewshire, 300 houses; lower ward district of Lanarkshire, 250 houses; Kinross county, 20 houses; eastern district of Dumbartonshire, 300 houses; western district of Dumbartonshire, 200 houses per annum; and central district of Stirlingshire, 50 houses—a total of 1,266 houses.

Pontefract Town Council have included in their forthcoming schemes the erection of an additional 300 houses at Baghill.

Aldershot Town Council have approved of a town-planning and housing scheme which will be put into operation immediately an opportunity presents itself.

Cuckfield Rural District Council have intimated to the Local Government Board that they will be prepared to provide thirty cottages for housing their workmen.

Truro Rural District Council have been urged by the Local Government Board to consider without delay the housing necessities of the district. The council had tentatively agreed that about thirty houses would be needed, but had deferred the consideration of the matter.

Complaint was made recently by the Lord Mayor of Dublin of the treatment of the city council's housing schemes by the Local Government Board. First the department, in 1915, informed the council that no more loans could be sanctioned for housing until the Allied Armies were victorious. Then, in 1917, Mr. Duke (as he then was) promised that money would be immediately forthcoming for the purpose; but six or eight months afterwards an intimation was received that no more money was to be had.

The surveyor to the Penmaenmawr Urban District Council, Mr. R. J. Hughes, has prepared a report for the Local Government Board on the housing question. He states that at least fifty houses are needed in the district. The council approved the report, and declared that in their opinion provision should be made for the compulsory acquisition of land on reasonable terms, in order that houses erected for their workmen and their families may be let at rentals which they can afford to pay.

In a report submitted to the Abergele and Pensarn Urban District Council it was stated that six of the proposed houses of type A (parlour, kitchen, scullery, three bedrooms, and bathroom) could not be let at less than 17s. 6d. per week to be self-supporting, and the thirty-four houses of type B (parlour, kitchen, three bedrooms, and scullery with bath) could not be let at less than 14s. a week, and that the ten houses of type C (living-room, kitchen, scullery with bath in it, and three bedrooms) could not be let at less than 11s. 3d. per week. As not more than a 1d. rate could be devoted to the purpose unless the State made up the whole of the deficit, it would not be possible for the council to carry out an adequate scheme. It was decided to submit the scheme to the Government, with a request for more assistance.

River Pollution in Staffordshire.—Summarising, in his annual report, last year's work of the Public Health Committee of the Staffs County Council, Dr. George Reid, the county medical officer of health, states that matters have not improved as regards direct pollution of streams, both in the north and south of the county, by discharges from munition works. In some instances the connection of such works with sewers has taxed the purifying capacity of disposal works and rendered precautionary measures necessary in order to prevent serious damage to the plant.

CAMP DRAINAGE AND SANITATION.*

By W. H. Beswick, assoc.m.inst.c.e.

Camp drainage and sanitation comprises many variations from ordinary municipal practice. For the civil engineer it is quite a new experience, or, rather, adapting experience to new conditions; and previous to the outbreak of war Royal Engineers had no doubt mainly considered the subject from the summer-camp point of view, with the exception of Bulford, Tidworth and others, which latter camps or barracks were carried out in peaceful times when rapidity of construction was not so essential, and well-thought-out schemes were first prepared. The problem of new camp drainage became more difficult from the fact that construction and scheme had to proceed at the same time, not scheme first and construction afterwards, but the reverse; as one General put it to the author, "Do the work first and make the plan afterwards"!

The author was engaged by Messrs. John Jackson, Limited, to take charge of the drainage of the Salisbury Plain camps, comprised in their agreement with the War Office, and he arrived at Bulford on October 12, 1914, to find that drainage was urgently required to enable the camps then under construction to be ready for occupation before the approaching winter.

At this time no general scheme for dealing with camp drainage had been issued from the War Office; and, apparently, individual contractors or agents devised schemes most suitable to the camps they had under construction. In November, however, a memorandum was received, issued by the sanitary adviser to the War Office, setting out simple requirements for settlement tanks and land irrigation. These instructions read: "Small settling tanks should be constructed of a content equal to about one-tenth to one-fifteenth of the daily flow—the smaller proportion being for the larger volume." (This is equal to 2·4 or 1·6 hours' flow.)

A camp may consist of one or more units having the same or similar characteristics, and the Salisbury Plain camps with which the author is most closely associated comprised the following: Sling plantation (adjoining Bulford), 10 units (originally 11). Larkhill (including Durrington and Rollestone), 40 units (originally 60); Perham Down, 8 units; Parkhouse, 4 units.

All the foregoing camps were under construction, and all required drainage. At first it was only considered necessary to provide drainage for ablutions, bathrooms and cook-houses, with provision for floor washings and slop water from concrete areas, &c. Urine was not to be taken into the drainage system; and all latrines were on the pail system, the contents of which, as well as urine, were to be incinerated. Water supplies were then under construction or being considered, mostly by pumping schemes; so the question of daily allowance was important, and it was decided to make provision in drainage schemes for daily supplies not exceeding 10 gallons per head. No rain or surface water is provided for, as in most units this was afterwards dealt with separately in open gutters, &c.

For purposes of outfall sewers and works units had to be grouped, and in the camps under consideration this grouping worked out as follows: Sling Plantation to one outfall (Bulford hospital being drained into the existing system); Larkhill, Durrington and Rollestone, twelve outfalls (varying from one unit to sixteen); Perham Down, originally six outfalls, now five; Parkhouse, one outfall.

TANK DESIGN.

In accordance with the memorandum from the sanitary adviser to the War Office, a typical drawing for outfall tank for one unit equal to one-tenth the D.W.F. was prepared and issued to the various camps, these tanks being increased in number, and built in parallel to provide for the requirements of two or more units; those for Sling comprised five tanks. These were so arranged that sludge could be run off to sludge pits from any tank as occasion arose; neither screening nor grit chambers were provided.

It was soon found that these tanks were too small; in the case of Sling Plantation complete new works had to be designed, in which the existing five tanks were utilised as screening and grit chambers. In several installations, however, these small tanks are still in action after three years, and giving fairly satisfactory results, although requiring more regular and constant attention.

With a view to simplicity in working, more particularly as it was thought that complicated works would be neglected if left to the care of constantly changing troops, a design for tanks in duplicate was prepared.

The sewage first passes into a screening chamber common to both tanks, then through a screen, and, by submerged inlets, into the tanks, which have steep, inverted pyramid bottoms. The effluent is drawn off over a full width weir, first passing under a scum board. The screening chamber is also an inverted pyramid with a sludge valve at the bottom, while from the tanks sludge pipes are carried to a valve chamber leading to the sludge lagoon (the sludge being removed by hydraulic head), about 3 ft. head being found very effective. The screening chamber and tanks form two ponds, with a difference of from 2 ft. 3 in. in water-level, so that solids passing into the inlet channels are carried through the inlets to the tanks with an increased velocity, the effect of the continuous weir outlet being to prevent currents, and, at the same time, discharging the effluent in a thin film.

These tanks are found to answer excellently well for slop-water drainage, but where a water-carried system of drainage is installed, some modification of the screening and grit chamber is required to provide a flow through the screen so that the fæcal matter will be carried forward into the tanks.

In November, 1915, the author was transferred to the Royal Engineers, and has been employed since then in completing works designed by him for Messrs. John Jackson, Limited, and carrying out works, the designs for which have been prepared by the sanitary adviser to the Southern Command. These latter comprise works at the East and West Valley, Larkhill, and new works at Bulford for the existing camp.

In these works three different types of tanks have been installed, the largest being at the West Valley, where four tanks in parallel have been constructed, two being Dortmund and two being semi-Dortmund tanks, the effluent from which is carried across the valley in a 10-in. c.i. syphon on to suitable land remote from the camps. The East Valley works comprise three rectangular tanks in parallel; while Bulford extension consists of a roughing tank and four sedimentation tanks of rather novel construction. None of these works, however, have been in action long enough to allow any sufficiently correct data to be obtained which would permit conclusions to be drawn. It had been found in the existing works, both at Bulford and Tidworth, where large numbers of horses are kept, that scum on the tanks increased so rapidly that it reached the underneath of the concrete covers, and was gradually pressed down into the tank until scum and sludge met. The roughing tank at Bulford has been designed to obviate this difficulty, but it is too early yet to state results.

No filters have been provided for any of the foregoing works, disposal of tank effluent by irrigation having been found quite satisfactory; and where effluents have been discharged on to previously cultivated land concrete carriers have usually been provided, while on down land dugout carriers have proved effective. Where possible, carriers have been arranged to allow for separate daily discharges, so that each portion of land can be given six days' rest if found necessary. One acre per 1,000 population, or thereabouts, has been provided where possible, but most down land is so suitable for purposes of irrigation that much smaller areas have given excellent results. On the East Valley outfall, Larkhill, where temporary works have been in operation since the summer of 1915 until the permanent works were completed this spring, ten units, or a population approximately of 11,000, with a daily flow of 110,000 gallons or thereabouts, have been most successfully dealt with in an area under three acres.

CULTIVATION OF IRRIGATION AREAS.

Generally, the author does not advise that irrigation areas should be cultivated, especially on non-permanent camp sites, as he considers that if land under irrigation does its legitimate work of sewage purification satisfactorily, it is all that can be expected from it, and where cultivation is undertaken on these areas there is a liability to neglect either the irrigation or the crops, often to the detriment of both; therefore, one should be satisfied with work well done in the essential requirements for which the land is being used—viz., sewage purification.

This does not apply to down land, where, with proper attention, excellent grass crops can be obtained; and, as proof of this, last year the author cut and supplied in the form of green forage to the Army Service Corps at Larkhill, over 160 tons of grass—the small area of under three acres above referred to being cut four times, with a total yield of 60 tons.

Unfortunately, on these irrigation areas no final effluents are procurable for analysis, and no actual results of purification are available for comparison.

Many variations from the original conception of the requirements for the drainage system developed as the camps became occupied. First urine was added; then small concrete areas were provided at cook-houses for waste receptacles which had to be drained; overflows from horse troughs in most cases had to be provided for, and generally the drainage system as originally laid down had to be extended. One of the most troublesome questions, however, arose when it was found that large quantities of grease accumulated on the surface of the settling tanks, and stoppages in drains took place. It soon became necessary to consider the provision of grease traps, and, seeing that at this time all drainage was practically complete, this meant considerable and somewhat costly alterations. It was decided to provide grease traps to all cook-houses.

* From a paper read at a meeting of the Royal Sanitary Institute held at Swindon.

Public Service Motor Vehicles.

CHANGING FROM HORSE TO MECHANICAL HAULAGE: FUNDAMENTAL QUESTIONS.

A contribution of real help in the consideration of the relative economy of mechanical and horse haulage is to be found in an excellent handbook, "Commercial Vehicles of Great Britain" (Vol. I.), which the B. F. Goodrich Company, Limited, of 117-123 Golden-lane, London, E.C. 1, issued some time ago as a guide to prospective purchasers of motor vehicles. We may mention in passing that the handbook in question gathers into brief compass a comprehensive list of the chief makes and types of commercial vehicles manufactured in Great Britain, and provides material for profitable comparison by illustrating each vehicle on a separate page with the full official description below.

In the article to which we refer the aim of the writer is to analyse the fundamental questions involved in the change from horse to motor traction. "What makes the problem pressing is," he says, "the knowledge that the horse is, considered by his own performance, a wasteful machine. As a motor he is but 2 per cent efficient, so far as heat units are concerned—that is, of the heat energy taken in with his enormous meals he transmits but 2 per cent in draw-bar pull on the vehicle behind him. His limited hours of labour and his comparatively small capacity for load and speed, considered in connection with the expense of feeding, caring for and housing him (as well as his bulky vehicle and harness), condemn him at the start for inefficiency in transportation.

"On the other hand, the principal advantages of motor transportation are conspicuous. The mere economy in garaging these compact engines, requiring as they do about one-eighth the space of the horses and teams they replace, is a notable item. Instead of being 2 per cent efficient, they transmit from 50 per cent to 75 per cent of the energy of their "meals" into action. Moreover, their great speed and their tremendous capacity for load make them veritable giants in transportation. . . .

"The reason for the existence of the motor vehicle is that it carries more and goes faster than a horse and wagon. This is its fundamental justification. A motor vehicle constantly working with a capacity load attains the maximum of efficiency. According as it is interrupted in its daily travel, and according as its load falls below its rated capacity, by so much does it fail to realise the 100 per cent efficiency of which it is theoretically capable.

"Let us compare, for instance, a single horse and wagon capable of carrying half a ton at a speed of 4 miles per hour with a 2-ton lorry which is able to carry 2 tons at a speed of 12 miles per hour. Using the speed and load of the horse-drawn vehicle as units of comparison, we find that the motor vehicle develops three units of speed and carries four units of load. Carrying out these figures, we find that the 2-ton vehicle performs twelve units of work as compared to a single unit performed by the horse and wagon. This comparison will be clearer if we consider that the motor vehicle carries four times the load but develops only the same speed as the horse and wagon. In that event the motor vehicle does four times as much work as the horse and wagon. Now if this speed is increased to three times that of the horse, it will be seen that the motor vehicle not only carries four times as much, but carries it three times as fast as the horse-drawn vehicle, making the relative working efficiency of the motor vehicle twelve times that of the horse.

"Let us now suppose that this motor vehicle, which is capable of thrice the speed and four times the capacity of a single team, carries its load on a certain trip at a rate of 8 miles an hour. Inasmuch as it develops twice the speed of a team and carries four times the load, it still performs eight times as much work as the team. Imagine that this motor vehicle runs 12 miles an hour all day, but carries 1½ tons in the morning and only ½ ton in the afternoon. Its average load for the day is 1 ton, which is twice the capacity of the team, and with a speed of three times and a load of twice the team capacity, it does the work of six teams, even though during half the day it was engaged in carrying a load far beneath its capacity.

"With these facts in mind, we are able to produce what may be termed a formula of motor vehicle efficiency, using the efficiency of a single horse and wagon as a standard. This formula may be expressed as follows:—

Speed	×	Load	=	Work
As compared with team.		As compared with team.		As compared with team.

Or, leaving off the explanations, which are now understood, we may say that speed × load = work."

It is admitted that many variations will develop in different lines of business as a result of which the foregoing formula may not accurately disclose the result sought. Various external factors—length of hauls, road conditions and idle time, among others—affect the speed or loading of motor vehicles in an important degree, and consequently affect the work or returns to be expected from them. The problem requires careful accounting to discover what conditions have a bearing on the basic formula. One must now figure out in £ s. d. whether the work of motor vehicles compared with their cost exceeds work of one's horse delivery compared with its cost. It is apparent (says the writer of the article in conclusion) that whatever we may say against that discredited animal the horse, we must take off our hats to him in this one respect; he is still the standard by which other means of city and suburban transportation are judged, according to cost and according to results. The question is, How does the cost of motor delivery compare with that of the horse standard? We can do no more in this paper than to indicate the points which will come up in such a comparison. The cost of his present equipment is no doubt all too well known. The cost of the new equipment is not known, but may be estimated closely. The first cost of the motor vehicle is, of course, to be had to a penny. This, however, should not be charged against one year's expense, but should be distributed over the several years which can confidently be expected as the term of life of a good vehicle. The old equipment must be disposed of, perhaps all at once, perhaps gradually. As to the cost of operating the vehicles, reliable figures may be obtained from motor vehicle agents or trade journals which will give him a pretty close estimate. Certain things are already known to him, such as wages, interest, and terms of payment for the vehicles. To these he must add such factors as garaging the vehicles and keeping them in repair. Knowing the cost of his present equipment and the results he is getting from it, and having scientifically estimated the cost of a motor system and the results to be expected from it, he is thus in a position to make a reasonably convincing comparison, the result of which should have a distinct and logical bearing on his decision.

RELAXATION OF PETROL RESTRICTIONS.

The Board of Trade, after consultation with the Petroleum Executive, announce that it will not be possible for some time to withdraw entirely the restrictions on the use of petrol for driving motor vehicles. The Petroleum Executive are making arrangements to provide as quickly as possible increased supplies of petrol to be distributed by the Petrol Control Department for civilian purposes. The assumption that the cessation of hostilities would result in an immediate increase in the quantity of petrol available for civilian consumption is ill founded. As a matter of fact, the conditions resulting from the armistice have already involved a material increase in the consumption of petrol in connection with the Army in France, and the increased heavy demand in this respect will continue for some little time. On the other hand, it will take some time to so adapt the shipping position as to enable increased supplies to be brought into the country. Arrangements are being made at once for the transfer of ships which have been carrying fuel oil to the purposes of carrying petrol, but on account of the necessity for cleaning the ships it will be several weeks before they will be ready. In the meantime, having in view the greater facilities which will be available for increasing the petrol stocks later on, the Board of Trade will be able to some extent to relax the restrictions at an early date. It is therefore proposed that:—

1. The Motor Spirit (Consolidation) and Gas Restriction Order shall be modified so as to permit on and after December 1st next the use of motor spirit by licence-holders for driving motor vehicles of any type for all purposes within a radius of 30 miles of the place of residence or business of the licence-holder. So far as journeys beyond this radius are concerned, the restrictions will for the present remain in force. They will, however, be removed entirely as soon as it is possible to do so.

2 After January 1st next, if the conditions of the stocks of motor spirit at that time permit, the Petrol Control Department will be prepared to consider application from owners of commercial and public utility vehicles for an increase in their present allotments. Applications for licences will also be considered from owners of vehicles of this type who do not at present hold licences.

It is also anticipated that within a short period afterwards the department will be in a position to consider applications

for licences from private vehicle owners who do not at present hold licences and for increased allotments in the cases of existing licence-holders. It must be understood, however, that for some time to come motor spirit will only be obtainable under licence by the Petrol Control Department as hitherto.

GAS TRACTION.

The Automobile Association announce the receipt of a number of entries in the competition in which they offer a prize of £1,000 for the best system for the utilisation of coal gas as a motor fuel. In addition a large number have signified their intention to compete, but have not yet definitely entered as competitors. The closing date for the competition is December 31st. Those who intend to enter should communicate at once with the Secretary, Automobile Association, Fanum House, Whitcomb-street, London, W.C. 2.

ELECTRIC WORKS TRUCKS FOR STREET REFUSE COLLECTION.

The city engineer of Hull, Mr. F. W. Bricknell, has put forward the interesting suggestion that it might be possible to employ electric works trucks for the collection of street sweepings near the depots in order to release horses for heavier work. The Cleansing Committee have asked him to report further on the matter.

Rotherham Tramways Committee are inviting tenders for a new motor tower wagon.

Bedford Town Council have under consideration a proposal for establishing a municipal fire brigade equipped with modern fire engines and appliances.

Loftus Urban District Council are considering a proposal, which they have been asked to support, by the East Cleveland Brigade and St. John Ambulance, to provide a motor ambulance at a cost approximately of £1,000.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

THE AMALGAMATION PROPOSALS.

To the Editor of The Surveyor.

Sir,—Will "Justice" kindly inform your many interested readers whether every member of the Institution of Municipal and County Engineers obtained his membership by passing the institution's examination? Will he deny that the Municipal and County have recently intimated that they are prepared to receive applications for membership from engineers and surveyors who have not passed such examination? How does he propose to gain for engineers powers similar to those possessed by the medical fraternity so long as the former are a divided body of men?

By the tone of his remarks he avers that members of the Institution of Municipal Engineers are not qualified, and therefore unfit to hold the position of public health engineer. What, then, is the position of the many members of the Municipal and County who are also members of the Institution of Municipal Engineers?—Yours, &c.,

Equity.

November 16, 1918.

AIR RAID DAMAGE TO PUBLIC WORKS.

LOCAL AUTHORITIES AND THE COST OF REPAIR.

Asked whether, having regard to the fact that the damage done by enemy air raids to public works, sewers, &c., had varied greatly in different districts, he would reconsider the Treasury decision to throw the whole cost of repairing such damage upon local authorities, the Chancellor of the Exchequer said the matter had been further considered, but he had felt bound to adhere to the previous decision. He did not think that it would be right to transfer this expenditure from the local authorities to the Exchequer.

Bognor's Piggeries.—At a recent meeting of Bognor Urban District Council the surveyor, Mr. Oswald A. Bridges, presented the accountant's balance-sheet of the local pig-keeping scheme, stating that it showed a profit for the undertaking of £30. He considered, however, now that a good start had been made, that they ought to make anything from £150 to £200 profit each year. The council's piggeries were known throughout England and in America. Bognor was also quoted in a recent Local Government Board circular, and surveyors from all parts had been to see the undertaking. Mr. Bull said the progress reflected great credit upon Mr. Bridges, whose interest in the matter would benefit the ratepayers of the town. He had done wonders in the pig-keeping line, and he ought to be congratulated upon his success.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Was it not interesting to see in the *Daily Graphic* of October 19th a picture showing how the loose sand of the desert in Sinai was being made into roads for the passage of our troops by laying wire netting on the surface? Is it not evident that the applications of reinforcement are numerous and far-reaching, and that this method of treatment will probably be extended in many other directions where difficulties are encountered on soils which are unsuitable for traffic?

* * * *

As an instance of how surface waves can be formed by other than vehicular traffic, is not the broad path in Hyde Park extending, on the south side, from Hyde Park Corner to Knightsbridge Barracks, an object lesson? Does not this path show regular waves of considerable depth and height for nearly the whole of its length, and is it not evident that these must have been caused by excessive rolling, if we disregard the effects of perambulator and bath-chair traffic?

* * * *

Is it not to be hoped that the Government will withdraw at the earliest possible moment the restrictions which necessarily had to be placed on works of water supply, sewerage, sewage disposal and similar sanitary installations which were in progress at the outbreak of war? Is it not evident that these works are suffering as a result of being left in an unfinished condition, and that the sooner they are recommenced and finished the better it will be for the health of the community?

* * * *

Does not the recent decision in the appeal case of Dennis & Sons, Limited, *v.* Good settle—let us hope—once and for all the oft-disputed question as to whether a footpath is a highway or not? Is it not satisfactory to learn by this judgment that a footpath is a highway and that a farmer has no right to plough it up, or—presumably—to obstruct or divert it in any manner?

* * * *

Is there not something to be said in favour of the proposal to establish after the war a great memorial highway from Paris to Liége so laid out that it would pass through the principal scenes of the great strife and be plentifully ornamented with memorials symbolising the heroism and sacrifice of the troops of the allied nations? Is this not an idea well worthy of emulation in this country when the various proposals for arterial and other roads are carried into effect?

* * * *

While almost bewildered by the sudden manner in which the war has come to an end, are we not now with characteristic doggedness saying to ourselves, "Now *that* job is over, what is the *next* job we have got to undertake?" Is it not interesting to find that this is the attitude of the Government, and that they have already begun to form the necessary committees and organisations to deal with the vast problems of reconstruction that lie before us?

* * * *

Did not the recent article in The Surveyor on military road works in France provide most interesting and fascinating reading, and should we not all be very grateful to Mr. T. Salkield for having written it? May we not look forward to some descriptions and details of the remarkable road work that has been carried out in France and other theatres of war by the indomitable body of engineers who enlisted for this service and who have done so much to assist in defeating our enemies?

ASSOCIATION OF MANAGERS OF SEWAGE DISPOSAL WORKS.

ANNUAL MEETING AND DINNER.

The annual general meeting and dinner of the Association of Managers of Sewage Disposal Works will be held at the Holborn Restaurant on Thursday, December 5th.

At the annual meeting, which will open at 2.30 p.m., Mr. John Henry Garner, B.Sc. (member), will present for discussion a paper on "The Utilisation and Disposal of Sludge," illustrated by lantern slides. Subsequently the results and awards in connection with the competitive essay scheme will be announced.

The annual dinner is fixed for 6.15 p.m.

Roadmen's Holidays.—At the last meeting of the East Suffolk County Council, the county surveyor, Mr. W. Jervis, reported the receipt of applications from the roadmen for a half-holiday on Saturdays. This was to bring them into line with agricultural labourers. It was resolved to recommend that, provided roadmen work not less than 48 hours per week, the county surveyor be authorised to grant the half-holiday on Saturdays during the months of November, December, January and February.

KENT COUNTY ROADS.

MAINTENANCE COSTS: EFFECTS OF TIMBER HAULAGE.

Road maintenance, tar-painting and improvement work in the county of Kent during the twelve months ended March 31st last involved an actual expenditure of £140,363, representing an outlay on the 600¼ miles of roads of £233 8s. per mile. Costs per mile of the various operations worked out as follow:—Scavenging, £9·9; siding, clearing watercourses, mowing grass, &c., £6·8; repairs to footpaths, £1·1; repairs to carriageways, £138·6; surfaee-tarring, £60·9; repairs to drains and culverts. £·5; gritting roads and paths, £1·9; improvements, £2·5; miscellaneous, £14·1. The net expenditure out of county funds amounted to £123,571, which is equal to £205·9 per mile. In arriving at this figure credit has been taken for a sum of £5,486 paid by the Road Board towards improvements approved by them. The expenditure incurred in the repairs to county bridges and maintenance of roads over county bridges has been transferred, whilst receipts for repair of the roads over railway bridges, contributions from local authorities towards the cost of scavenging, and miscellaneous receipts for the repair of trenches opened out for gas, water, &c., sales of old iron, &c., have also been deducted from the gross expenditure.

In his annual report, Mr. H. T. Chapman, M.INST.C.E., the county surveyor, states that tarred slag macadam has been extensively substituted for granitc on the more important main roads, and observes that at prices now ruling it gives infinitely better value. Owing to the shortage of labour and the demands for military purposes very much less tarred Kent ragstone has been available, and this is to be regretted, more particularly because the use of this material would have saved rail and road haulage.

TAR-PAINTING.

During the year the total cost of tar-painting carriageways amounted to £36,609. The area treated was approximately 4,000,000 sup. yds., of which 1,876,425 yds. were dealt with by contractors and by local authorities, the latter assisting in one or two instances where the roads were adjacent to their districts. The quantity of tar used was 407,058 gallons.

Before tar-painting, all the roads were carefully patched with chippings and tar and all possible water holes and depressions filled up. This procedure not only greatly improved the surfaces but resuscitated many sections that under normal conditions would have been recoated with granite or tar-macadam and enabled the material available to be concentrated where most required.

The average price paid for tar during the year was 3d. per gallon.

To the urban authorities was paid £10,452 for the tar-painting of 1,478,131 sup. yds. of carriageways, which equals 1·7d. per sq. yd. Tar-painting proper therefore cost the county council during the year £47,061.

MATERIALS.

The total quantity of material used upon the roads under direct control was 86,399 tons or yards. The average price per ton for granite macadam, exclusive of haulage, was 21s. 1d., as compared with 17s. 5d. in the previous year. Tarred slag macadam cost 21s. 9d. as compared with 19s. 1d. in 1916-17.

DAMAGE BY GOVERNMENT TRAFFIC.

The county surveyor states that in addition to the shortage of imported materials the output of local stone and flints was much less than in former years, and owing to the necessity of concentrating the efforts of his department on the most important, many other roads have in consequence had very little attention. Much of the material, labour and plant has been engaged in the repair of roads for military purposes and in the reinstatement of damage by military traffic. Again, the expenditure compared with former years has not been reduced in the same ratio as the work carried out owing to the increased cost of all labour, materials, &c. The county council has had to bear a share of the cost of work entailed in the repair and reinstatement of roads damaged by Government traffic, although the various Government departments have contributed largely towards the expenditure.

Mr. Chapman remarks that the extra damage to the roads caused by the haulage of timber has become a serious factor to contend with on many main and district roads throughout the county. A considerable proportion of the roads affected by this traffic were not, he points out, previously of great county or local importance, and could consequently be maintained in adequate condition at comparatively small cost. Now, however, these roads must be repaired and maintained at considerable cost.

"The Government," Mr. Chapman adds, "has recognised its liability in this respect so far as some timber supplies are concerned, but not in all cases, and it is hoped that the ratepayer will not be unduly penalised. It is exceedingly difficult to fix liability for damage to roads by timber haulage where several interests are concerned, and there are many factors to be considered before making individual claims for damage. We have, as in previous years, used our utmost endeavours to keep the most important roads in the best possible condition, having regard to the facilities available, and I venture to say that, apart from those affected by Government extraordinary traffic, they are in as good condition as can be expected after four years of war No works that might be termed 'luxuries' have been carried out during the year, the only improvements being in the nature of strengthening and improved surfacing, which it is now generally admitted are necessities, and may one say economies?"

LAW NOTES AND QUERIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

Water Supply: Leakage in Communication Pipe: Opening up Road: Expenses: Metropolitan Water Board (Various Powers) Act, 1907, Sec. 71.—An important point as to the expenses chargeable against the owners of premises in the ease of a leakage in a communication pipe was decided in *Metropolitan Water Board* v. *David* (King's Bench Division, October 17th). This was an appeal by the defendant from the decision of a county court judge. The board elaimed £4 6s. 5d. for the cost of opening and reinstating the roadway in front of the defendant's house, for the purpose of locating a leakage in the communication pipe. When the leakage was located, the board gave the defendant notice to repair the pipe, which he accordingly did; but he contended that he was not liable for the cost of loeating the leakage. Sec. 71 of the Metropolitan Board (Various Powers) Act, 1907, provides that if it shall appear to the board that by reason of any injury to or defect in a communication pipe, any waste of water, or injury, or risk of injury to persons or properties is caused or likely to be caused, the board may exccute the repairs without any previous request, and recover the expenses of so doing. The county court judge held that the work of opening the roadway and locating the leak was "repairs" within the meaning of the section, this being (in his view) an obvious and necessary incident of the work of repairing. He therefore gave judgment for the board. But the King's Bench Divisional Court over-ruled his decision, and allowed the appeal. Mr. Justice Rowlatt, in the course of his judgment, pointed out that the section begins with the words "if it shall appear to the board," and said that it seemed quite clear from this, that the powers under the section (which were powers to do the works on property and charge the owners) only arise when it "appears to the board" that there is a defect in the pipe and when they have made up their minds. If they chose to guess they must guess rightly. It, in fact, it did not "appear" to the board until they reached the pipe and found it was leaking, that this was the source of injury, or apprehended injury, to persons or property, they were not entitled to throw upon the owner the expenses of exploring and ascertaining the leakage.

Excavation near Highway: Fence in Bad Repair.—"Percival" writes: The owner of a brickfield in this district is commencing to excavate his land at a distance of about 5 yds. from a public road. There is a post and rail fence separating the land from the road, but it is in very bad repair. I should be greatly obliged if you will advise me whether the owner would be liable in case of an aecident occurring after the excavation has been made, owing to the bad condition of the fence?

The owner is bound, under sec. 70 of the Highway Act, 1835, before making the excavation, to erect a wall or fence sufficient to conceal or screen the excavation from the road, and in my opinion he would be liable in the event of an accident occurring in consequence of his failure to do so. He would also incur a daily penalty not exceeding £5 so long as this obligation remained unfulfilled.

Coal Conservation and Electric Power.—Asked in the House of Commons whether he was aware of the opinion held by borough councils and others to the effect that the recommendations of thc reports of the Coal Conservation Subcommittee to the Ministry of Reconstruction and the Electric Power Committee to the Board of Trade should be translated into effective legislation by Parliament at the earliest possible moment, and whether he would take steps to carry out these recommendations, the President of the Board of Trade stated that he fully realised the importance of the matter, and hoped to be able to place before Parliament proposals for legislation with the least possible delay.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Ashton-under-Lyne T.C.—It is proposed to carry out extensions at the tramway depot in Mossley-road, at an estimated cost of £18,309.

Dartmouth T.C.—The town council have referred the question of the provision of public baths to a committee for consideration.

Southport T.C.—A scheme is being considered for the erection of public and municipal buildings in Lord-street.

West Sussex C.C.—Owing to the increased military traffic between Middleton and Bognor, the county surveyor, Mr. H. W. Bowen, has been directed to apply to the Road Board for a grant towards widening Felpham Bridge, and to prepare plans and an estimate of the cost.

REFUSE COLLECTION AND DISPOSAL.

Birmingham T.C.—The salvage of refuse which has been undertaken by the Salvage, Stables, and Lighting Committee since the war began has been the means of increasing the revenue of the department by £8,000 per annum. In order that everything of value may be retrieved it has been decided to introduce at the close of the war considerable improvements not only in the disposal, but in the collection of refuse. Each house is to have two bins, and householders will be required to keep ashes and sweepings separate from all other kinds of refuse.

Budleigh Salterton U.D.C.—It was reported that £18 17s. 6d. had been obtained from the sale of waste paper since June last.

Ossett T.C.—The town council have adopted a recommendation of the Sanitary Committee to undertake the scavenging of the borough by direct labour from January 1, 1919, and to purchase the necessary horses, carts and implements, at an estimated cost of £1,000. The Sanitary Committee, it was stated, have arrived at the conclusion that the work of scavenging had been so inefficient under the contract system that it must be carried out by the council.

ROADS AND MATERIALS.

Berks C.C.—With reference to the road from Ascot to the county boundary at Blacknest, the council had received an intimation from the Road Board that they propose to recommend the Timber Supply Department, Board of Trade, to contribute the whole cost of the repairs necessitated by their traffic, to Sections 1—5, and the War Department to pay for the cost of reinstating the remaining Sections 6—9 (approximately half the total length of road damaged) less the amount provided for these sections in ordinary maintenance for the current year. The estimated cost is £1,410.

Blaydon U.D.C.—The council are applying to the Local Government Board for sanction to borrow money to cover the cost of widening Smailes-lane at Rowlands Gill, and the road between Blackhall Mill and Chapwell.

Dorchester T.C.—The town council have agreed to comply with the request of the Road Board that they should contribute £60 towards the straightening of St. George's-road, near the sewage works, where the bend is acute and dangerous.

East Sussex C.C.—Some of the difficulties incidental to the construction of the Newhaven-Seaford road were described by Major Thornton, in moving the report of the Roads and Bridges Committee. If the council had had civil labour, he remarked, the road would have been finished two years ago. They started off with the labour of conscientious objectors, of whom they had 270, but they only did about thirty men's work. Since then they had been depending on what labour they could get supplied by a labour unit at Newhaven, chiefly by men on their way abroad. The county council were not paying the cost of the road, but it mattered very considerably to them as regarded convenience. The county surveyor had had an interview with several gentlemen in a very high position, and they had now real hopes of finishing this road within six months after peace was signed.—The council have resolved to make application to the Government for financial assistance in respect of the sea defence work for the protection of the main road running from Brighton through Rottingdean to Newhaven.—With respect to the recovery of compensation for damage to roads by the haulage of timber by different firms (apart from damage by Government haulage, for which the Board of Trade was responsible) it was stated that a good deal of uncertainty and delay had been caused by the Government's attitude, and the council resolved that very strong measures should be taken with a view to safeguarding the position of the highway authorities. The council had therefore asked the chairman to support this view at the meeting of the County Councils Association, with a view to pressing the matter upon the attention of the Government.

Helmsley R.D.C.—On the subject of the serious damage caused to the roads by timber haulage, the surveyor, Mr. W. Hunton, said he took the opportunity of measuring a load of timber, and he found it weighed 7 tons. The tread of the wheel was 4½ in., and, according to the county council by-laws, these wagons were only allowed to carry loads up to 4 tons. It was decided that the damage to the roads should be estimated by the surveyor to the Kirbymoorside Rural District Council and Mr. Hunton. It was also decided that proceedings to recover the cost of the repairs should be taken. As to the condition of the roads, the surveyor stated that the council had by their own decision liberated the men for work on the farms, where they got better wages. The council eventually agreed to offer the men the same rates of pay as the farm labourers, which, it was stated, meant 41s. per week next month.

Linlithgowshire C.C.—A recommendation has been submitted to the Ministry of Reconstruction for a scheme to reclaim a large part of the foreshore on the Forth, and to construct a shore roadway from Bo'ness to Port Edgar.

Naas No. 1 R.D.C.—The county surveyor, Mr. J. Rorke, applied for a further amount for the upkeep of the roads placed in his own charge in the vicinity of Kilcullen, and the council agreed to an additional vote of £230, with £450 to provide for the hire of steam roller. The necessity for the increase was stated to be a very considerable advance in wages, and the fact that the roads are being subjected to heavy timber traffic.

Newton Abbot R.D.C.—The road surveyor, Mr. W. Olver, reported that Major Logan, R.E., with the county surveyor, had inspected the roads at Bagtor, Ilsington, damaged by timber traffic, and Major Logan considered the council had a good case for a claim for extra damage.

Rugby R.D.C.—An intimation has been received from the Road Board of their intention to contribute towards the cost of repairing a road which has been extensively used for Government traffic.

Skibbereen R.D.C.—It was reported that a great deal of road work had not been carried out by the contractors, and an explanation offered was that labour was both scarce and dear. The cost of materials, it was stated, had not been advanced upon pre-war prices.

Uxbridge R.D.C.—It was reported that the Road Board were proceeding with the repairing of about 6½ miles of roads in the Hillingdon district, and in reply to a letter of inquiry from the board, the council agreed to make an offer of £120 towards the cost of the work.

SEWERAGE AND SEWAGE DISPOSAL.

Barnet U.D.C.—The council have resolved to prepare a drainage scheme for Totteridge as soon as circumstances permit.

Bradford T.C.—It was reported that a satisfactory settlement has been reached between the city council and the contractors for the Esholt tunnel. The work by the contractors was stopped a couple of years ago by the Ministry of Munitions, who refused permission for either the purchase of the necessary material or the employment of labour to carry out the work. Since then it has been a disputed question as to whether, by the action of the Government, the contract became void, or whether, as was contended by the corporation, the contract was still alive and the work to be resumed by the contractors after the Government's embargo was removed.

Bristol T.C.—Alderman Swaish, who has been re-elected chairman of the Sanitary Committee, in the course of some remarks at the first meeting of the committee for the year, alluded to the services of the city engineer, Mr. L. S. McKenzie, who, he remarked, had been most obliging and attentive, as well as efficient. Mr. McKenzie merited their absolute confidence, and he was sure the committee gave it to him.

Cambridge T.C.—With respect to the report that objectionable sewage was being discharged from the sewage farm into the Cam, the town council have written to the Conservators of the Cam to say that the Sewage Disposal Committee did not accept the statement that crude sewage was discharged into the river, as this was never done. However, the committee had decided to take out of cultivation several of the plots of land now used for growing food, so that the amount of land available for filtration purposes would be increased.

Huddersfield T.C.—It was reported that the sewage disposal works had been efficiently maintained during the municipal

year, when 4,021,770,000 gallons of sewage, exclusive of storm water, was treated. The quantity of sludge and solid matter removed in the various processes was 81,700 tons, and the quantities of by-products recovered were as follows: Fertiliser, 3,032 tons; grease and grease foots, 750 tons. Difficulty in obtaining additional machinery prevented the further development of this plant.

Pontefract T.C.—It was stated at the last meeting of the town council that it would be necessary to construct sewage outfall works, at an estimated cost of £20,000.

WATER, GAS, AND ELECTRICITY.

Bangor T.C.—The town council have passed a resolution viewing with alarm the proposed alienation of the water supply from Lake Idwall to a company, and affirming that while they do not contemplate any immediate necessity for the increase of the town's water supply, they are prepared to enter into negotiations with the Penrhyn estate with the view of securing the right of utilising the water from the lake.

Blofield R.D.C.—With regard to the sinking of a new well at Halvergate the Local Government Board wrote that as it was not proposed to defray the cost out of the loan no sanction on the part of the board was required. If the sinking of a well resulted in the provision of a supply of water the expenses would be chargeable as a special expense on the parish concerned without any order of the board.

Buxton T.C.—The town council propose to borrow £570 for a 6-in. water main to the low level area of the town.

Liverpool T.C.—The necessity for a third pipe-line from Lake Vyrnwy to Liverpool was alluded to at the meeting of the Water Committee by Colonel Porter, who also pointed out the importance of avoiding waste in every possible way. In this matter, progress has already been made by training wounded soldiers in the discovery of waste by sounding at night, but it may still be necessary to increase the staff engaged in this work, and to inaugurate propaganda urging upon the public the necessity of conserving in every way the water resources of the city.

Northampton T.C.—Owing to the urgent need for an additional water supply before the summer of 1919, the water engineer has considered alternative schemes for its improvement. A scheme for taking water from Higham Ferrers and Rushden Water Board was ruled out as impracticable because the necessary pipes could not be obtained within a reasonable time. With respect to taking water from the Hollowell Brook it was pointed out that the springs were "distinctly polluted," and in order to remedy this the water engineer suggested the chemical treatment by chlorine, a process which has been in operation in London and New York for a considerable period. On the question of the cost of the process it was stated that at the present time no reliable estimate can be given. The cost of chlorinating plant for treating the bulk supply would be, approximately, £600. The Water Committee propose, in addition to chlorinating the bulk supply, similarly to treat isolated pollutions of the Stowe Brook at a cost of from £100 to £150 each. In addition to the cost of chlorinating plant, a pump will be required to deliver the water through the Hollowell Tunnel into the Ravensthorpe reservoir. No reliable estimate of the cost can be given, as the committee will have to purchase any pump on the market that is suitable for their purpose. The town council, being of opinion that the temporary supply required is a matter of urgent necessity, have delegated to the Water Committee all necessary powers to carry out the scheme for chemical treatment of the water from the Hollowell Brook at the earliest possible moment.

Walsall T.C.—The Electricity Committee recommend the purchase of a rotary converter for the electricity works at a cost of £3,370, a condenser motor at a cost of £325, and a feeder panel at a cost of £410.

ROAD DAMAGE BY TIMBER HAULAGE.

ASSISTANCE FOR LOCAL AUTHORITIES.

In the House of Commons on Monday Sir Francis Blake asked the Minister of Reconstruction whether his attention had been called to the damage which had been caused to the roads by the haulage of timber and other materials, and what steps were being taken to assist the various road authorities to meet the expenses thereby entailed upon them.

Mr. Macpherson, who replied, said he would refer his hon. friend to the reply given by the President of the Board of Trade to the hon. Member for Tiverton on July 11th last. [See THE SURVEYOR, July 19th, p. 34.] A Joint Roads Committee had been appointed by the Army Council to deal with all questions of damage to roads arising out of haulage of timber used for national purposes, and the policy to be adopted in assisting highway authorities was now under consideration by the committee in conjunction with the Treasury, and it was anticipated highway authorities would shortly receive definite advice.

PERSONAL.

Major R. G. Grant, burgh surveyor and sanitary inspector of Aberlour, Banffshire, has resigned.

Mr. James Blakeley, surveyor to the Portsdown Urban District Council, has received a war bonus of £25 a year.

Mr. W. Matthews Jones, city surveyor of Chester, has been appointed refuse salvage officer to the Hackney Borough Council.

Mr. Broadhead, acting architect to the Swansea Town Council, has been appointed borough architect of Rotherham at a salary of £500 a year.

Mr. A. P. Horsley, borough engineer of Hartlepool, was recently voted a war bonus of £25, in addition to a bonus of a like sum already granted.

Mr. Percival T. Harrison, ASSOC.M.INST.C.E., borough and water engineer of Chelmsford, has had his salary increased from £440 to £500 per annum.

Mrs. A. Taylor Allen, wife of Mr. W. Taylor Allen, surveyor of Portslade-by-Sea, has been elected a member of the local Food Control Committee.

Mr. James Hunter, road surveyor to the Arbroath District Committee of Forfarshire, has been voted £25 per annum towards the upkeep of his motor car.

Messrs. Stewart, McCullen, McCandlis, Macoun, and McKeown, assistant surveyors to the Down County Council, have been voted a war bonus of £25 each.

Mr. H. Collins, borough surveyor of Colchester, has been voted an honorarium of £50, with the promise that his application for an increase of salary will be considered in April next.

Mr. O. Claude Robson, for over forty years engineer and surveyor to the Willesden Urban District Council, has been presented by the departmental staff with a gold watch and silver tea-service on his retirement.

Mr. J. S. Killick, county surveyor of Herts, has had his salary increased to £1,300, upon the understanding that during such time as Mr. Killick is employed as chief engineer and manager of the Road Board the Treasury shall pay to the county council the sum of £500 per annum.

Mr. A. A. Blackburn, of Belfast, has been appointed engineer and manager of the Huddersfield Corporation tramways, at a salary of £600 per annum. He is a native of Dewsbury, served three years in the Manchester City tramways department, and during the past fourteen years has been chief engineer and assistant to the general manager of the Belfast City tramways.

OBITUARY.

Mr. John William Harrison, engineer and surveyor to the Uxbridge, Middlesex, Rural District Council, passed away on Thursday, the 14th inst., we regret to state. He was appointed to the Uxbridge post in August, 1909, being one of 146 applicants. He was also engineer to the Uxbridge and Yiewsley Joint Drainage Committee. Mr. Harrison was for some years in the sanitary department of the Bradford City Council, then for seven years building surveyor to the Birkenhead Corporation, and afterwards surveyor to the Wombwell (Yorks) Urban Council. He was a member of the Institution of Municipal and County Engineers, and was the author of a book, "Lessons on Sanitation." Mr. Harrison had been in ill health for a considerable time.

The Utilisation of Damaged Foodstuffs.—A new Order, known as the Damaged Foodstuffs Order, 1918, which will come into force on December 1st next, will prohibit the destruction of any of the following articles which have been condemned or are unfit for human consumption:—Meat of any animal, including bones; non-edible slaughterhouse waste; fish, including fish offal or fish waste; tinned foodstuffs; imported foods liable to Customs duty. The Order does not interfere with the present powers possessed by local authorities for the condemnation of damaged foodstuffs.

FOR OTHER ADVERTISEMENTS
See End of Paper.

TRIPLEX' UNSPLINTERABLE SAFETY GLASS for sale.—15s. a piece: 110 pieces, size 13 9/16 by 13 7/16 by 1/4 in. plate. 7s. 6d. a piece: 40 pieces, size 7 by 7 and 8 by 8 in. All new and in perfect condition.—Apply Box 1,675, Offices of THE SURVEYOR, 24 Bride-lane, Fleet-street, E.C. 4. (3,923)

FOR SALE.—13-ton Aveling and Porter Steam Road Roller, No. 7,514 Morrison's Scarifier attached, in perfect working order. Can be seen under steam if desired.—Offers to be received by D. L. Bayne, County Road Surveyor's Office, Dunblane.

THE EFFICIENCY OF THE MUNICIPAL MACHINE SHOP.

Readers of The Surveyor and Municipal and County Engineer are only too familiar in these days with the difficulties which are everywhere being encountered in municipal and other machine shops, and in the use of power-driven vehicles of all descriptions. When one reflects upon the absolutely abnormal conditions existing in every single industry directly or indirectly connected with engineering one is filled with amazement at the successful manner in which those responsible for our great public services have managed to carry on with little or nothing in the way of inconvenience to the general public, or the slightest interruption either in output or means of transport. The great public outside, as a general rule, have little or no knowledge of the problems that have from time to time faced those in control of our machinery. If they had, they would have nothing but admiration for the extreme efficiency everywhere manifested by the men responsible for the upkeep and maintenance of public utility plants throughout the kingdom.

Quite how the miracles have been worked is sometimes matter for wonder, even on the part of those who have continued to carry on. Too often, when vital machinery stops, a survey of the situation quickly discloses the fact that a spare part to replace the fractured member cannot be obtained, either in this country or any other, and in such circumstances there is nothing for it but to call in experts familiar with the science of metal fusion.

An Example of Barimar Repair Work.

(A Diesel cylinder cover, 4 ft. in diameter, weighing 1½ tons, was cracked between exhaust and inlet valve housings, and through holding-down bolt, alongside and across top of head, the average thickness of metal being 1¾ in. It was impossible to obtain replacement, as the engine was of Belgian manufacture, but an effectual repair was made by Barimar, Limited, in seven days, under the Barimar guarantee of "No cure, no pay." Barimar applied tests before despatch, and Mr. Teague's tests with full working load produced a working pressure of about 700 to 880 lb. per square inch.)

There are, of course, various methods applicable to such work as is necessary in such circumstances, but the great thing is to discover by what process and by whom the fractured part may be re-created, since no two classes of metals can be treated in precisely the same way with equally good results. Moreover, the science of metal fusion is one of comparatively recent date, and none but those who have kept themselves abreast of the newer developments, and have introduced the necessary plant, can hope to give the machine-user that which he is entitled to expect.

Time was when our great Government Departments were inclined to look askance at the work of the welder, for reasons which need not now be entered into. Suffice it to say that, from the British Admiralty downwards, there is no great public department in this country which has not been absolutely convinced of the extreme uses to which metal fusion may be put in maintaining machine efficiency.

Side by side with this greater use of the expert welder by Government Departments has grown up a similar desire on the part of municipal officials, who are to-day everywhere calling to their aid metallurgical specialists whose business it is to reconstitute fractured machinery of all kinds, from the mammoth part of a Dreadnought to the minor unit that will fit the waistcoat pocket.

It is matter for congratulation that British metallurgical engineers have taken off their coats and gone into this business with a thoroughness that leaves nothing to be desired, and have built up an organisation which renders for ever unnecessary a return of the German specialist to a field which in early days he made particularly his own. Perhaps no better illustration can be given than that from the pen of Mr. Francis Teague, the electrical engineer of the corporation of Bath, who in his public capacity found it necessary to call in the well-known London specialists, Messrs. Barimar, Limited, of 10 Poland-street, London. We reproduce on this page a photograph of the particular repair carried out at the request of Mr. Teague, and the striking testimonial given by this gentleman should prove of extreme use to engineers in charge of both municipal and private installations all over the kingdom.

Writing to Barimar, Limited, under date of October 10, 1918, Mr. Teague says:—

"You will no doubt be pleased to learn that the welding you recently carried out on one of our Diesel engine cylinder heads was a complete success. When the weld was cleaned up it was found to be uniformly solid, and it could only be detected by the slight difference in colour between the original cast iron of the cover and the new cast iron used in the weld. It was tested by hydraulic pressure without showing the slightest defect. It was replaced on the engine and was heated to its maximum temperature by running the engine on full load, and reduced to normal temperature by stopping the engine and continuing the circulation of the cooling water, this being repeated several times in close succession, and the results were entirely satisfactory. The temperatures and pressures to which this head are subjected are extremely high, and I congratulate you heartily on the result of your work. The engine in question is rated by the makers at 250-h.p. per cylinder, and you have completely demonstrated the economy of your system, as the cost of this job to us was but a fraction of the cost of a new cylinder head."

This, it must be admitted, is a handsome tribute to the skill and resource of the Barimar Company of which they are entitled to take full credit, and such a testimony as this should serve to spur them on in their endeavour to eradicate, or at least minimise, the inconveniences inseparable from the breakdown of modern machinery. So justly famous have Barimar, Limited become for this highly specialised work that the company has recently been approached with the view to starting similar business organisations in the United States, Italy, India, Africa, China, and Australia.

Road Maintenance in the Isle of Ely.—At the last meeting of the Isle of Ely County Council it was stated that the average cost of the roads per mile in the northern roads district was £90 11s. 1d., as against £96 8s. 3d. in 1917, and including improvements £101 6s., against £102 19s. 6d. Manual labour cost £24 5s. 8d. per mile, against £20 16s. 4d. in 1917, and team labour £7 per mile, against £4 17s. 3d. In the southern roads district the average per mile was £109 8s. 11d., against £82 18s. 9d., and including improvements £115 0s. 7d., against £91 10s. 8d. The roads had cost 25 per cent more in the past year compared with previous years.

Dry Rot in Wood Flooring.—St. Nicholas' Chapel, an imposing fifteenth-century building at King's Lynn, has been seriously affected with dry rot in the wood flooring of the nave. It became necessary for the floor to be entirely taken out and replaced at a total cost of about £500, for there was danger that the remarkable roof carvings might become infected with the floating spores. The authorities have taken precaution against a recurrence of the trouble, which was caused by rising dampness, by waterproofing the concrete under the new wood paving blocks with the powder "Pudlo," a product manufactured in King's Lynn itself.

APPOINTMENTS VACANT.

Official and similar advertisements received up to 4.30 p.m. on Thursdays will be inserted in the following day's issue, *but those responsible for their despatch are recommended to arrange that they shall reach* The Surveyor *office by noon on* Wednesdays *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

TEMPORARY ENGINEERING ASSISTANT.—November 25th.—Barrow-in-Furness Town Council.—Mr. W. C. Persey, borough engineer and surveyor, Town Hall, Barrow-in-Furness.

ROAD AND GENERAL FOREMAN.—November 25th.—King's Lynn Town Council.—Mr. Raymond A. Newstead, borough surveyor, Town Hall, King's Lynn.

SURVEYING ASSISTANT.—November 25th.—Nantyglo and Blaina Urban District Council. £5 per week.—Mr. L. A. Wallen, clerk, High-street, Blaina, Mon.

TEMPORARY SURVEYING AND ARCHITECTURAL ASSISTANTS (2).—November 27th.—Felling Urban District Council.—Mr. Chas. W. Hall, surveyor and architect, Council Buildings, Felling.

ARCHITECTURAL ASSISTANT.—November 28th.—Nantyglo and Blaina Urban District Council. £5 per week.—Mr. L. A. Wallen, clerk, High-street, Blaina, Mon.

SURVEYOR, WATER ENGINEER AND INSPECTOR.—November 29th.—Leiston-cum-Sizewell Urban District Council. £200 a year.—Mr. H. A. Mullens, clerk, Leiston, Suffolk.

SURVEYOR'S ASSISTANT.—November 29th.—Twickenham Urban District Council. £250 a year.—The Surveyor, Town Hall, Twickenham.

INSPECTOR OF NUISANCES.—December 3rd.—Docking Rural District Council. £2 10s. per week.—Mr. J. A. Stoughton, clerk, Fakenham, Norfolk.

INSPECTOR OF NUISANCES.—December 5th.—Godstone Rural District Council. £250 a year.—Mr. C. Phillips, clerk. Council Offices, Oxted.

ARCHITECT FOR HOUSING.—December 7th.—Witney Urban District Council.—Mr. Robert F. Cuthbert, clerk. 28 Bridge-street, Witney, Oxfordshire.

DRAUGHTSMAN.—Gold Coast Government Railway. £350—£400, with £60 war bonus.—Crown Agent for the Colonies, 4 Millbank, S.W. 1.

WATER INSPECTOR AND WATERWORKS FITTER.—Chichester City Council.—The City and Water Engineer, Chichester.

UNDER ROAD FOREMAN.—Maidstone Town Council. £3 per week.—The Borough Surveyor, Maidstone.

DISTRICT WATER SUPERINTENDENT.—Sutton Coldfield District of the South Staffs Waterworks Company.—Mr. Fred J. Dixon, engineer-in-chief, 26A Paradise-street, Birmingham.

DRAUGHTSMAN.—Ministry of Munitions (Department of Mechanical Transport).—Director of Mechanical Transport, 1 Grosvenor-place, S.W. 1.

MUNICIPAL CONTRACTS OPEN.

Official and similar advertisements received up to 4.30 p.m. on Thursdays will be inserted in the following day's issue, *but those responsible for their despatch are recommended to arrange that they shall reach* **The Surveyor** *office by noon on* **Wednesdays** *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Engineering: Iron and Steel.

DUBLIN.—November 27th.—For the supply and installation of a complete generating set of approximately 3,000 to 5,000 kw. capacity, for the Electric Supply Committee.—City Electrical Engineer, Fleet-street, Dublin.

MANCHESTER.—November 29th.—For the supply and erection of three-phase, 6,600 volt sub-station switch gear at any sub-station in the supply area.—Mr. F. E. Hughes, secretary, Electricity Department, Town Hall, Manchester.

WARE.—December 2nd.—For the supply and fixing of a "Permutat" water-softening apparatus.—Mr. G. H. Gisby, clerk, Union Offices, Ware, Herts.

WALSALL.—December 5th.—For the supply and erection of one 500-kw. rotary converter equipment for tramways supply.—Mr. H. A. Howie, manager, Electricity Department, Wolverhampton-street, Walsall.

SOUTHAMPTON.—December 10th.—For supplying and fixing two 10-in. centrifugal pumps and motors, together with erection and delivery pipes.—Mr. J. A. Crowther, borough engineer, Market Chambers, Southampton.

Roads.

GLANFORD BRIGG.—November 25th.—For the hire or purchase of two second-hand 6-ton trailer wagons.—Mr. C. A. Howard, highway surveyor, Brigg.

MANCHESTER.—November 26th.—For the supply of granite setts, for the Tramways Committee.—Mr. J. M. McElroy, general manager, Corporation Tramways, 55 Piccadilly, Manchester.

LONDON.—November 27th.—For repairs to roads at Park Fever Hospital, Hither Green.—Mr. T. Cooper, engineer-in-chief, Metropolitan Asylums Board, Thames Embankment, E.C. 4.

CHELMSFORD.—December 2nd.—For the supply of about 500 tons of Guernsey, Penmaenmawr or Leicester granite broken to 2-in. or 1½-in. gauge, and ¾-in., ½-in., and ¼-in. granite chippings.—The Borough Engineer, Municipal Offices, Chelmsford.

Sanitary.

TADCASTER.—November 28th.—For works and materials required in the excavation and laying of 160 yds. of 9-in. earthenware pipe sewer and manholes.—Mr. H. C. Wood, sanitary surveyor, Tadcaster.

JOHANNESBURG.—January 8th.—For the supply of 5,000 sanitary pails, with eyelet holes and lids.—Inquiry Office, Department of Overseas Trade (Development and Intelligence), 73 Basinghall-street, E.C. 2.

Stores.

NOTTINGHAM.—November 28th.—For the supply of cement, blue lias lime, red brick, blue bricks, timber, stoneware pipes, iron castings, iron gullies, York flags, kerb, granite setts, broken granite, ironstone slag, chippings, river gravel, picks, shovels, scoops, coal, ironmongery, scavenging and other brushes, disinfectants, refined tar, pitch and creosote oil.—Mr. Arthur Brown, city engineer, Guildhall, Nottingham.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

DECEMBER.

5.—Association of Managers of Sewage Disposal Works: Annual meeting, 2.30 p.m.; annual dinner, 6.15 p.m. Holborn Restaurant, London.

13.—Institution of Water Engineers: Winter General Meeting, Burlington House, London. 2.15 p.m.

APPOINTMENTS OPEN.

WITNEY URBAN DISTRICT COUNCIL.
TO ARCHITECTS.

The Council require at once the services of an Architect for preparing plans and superintending the construction of Dwellings for the Working Classes, in the Urban District of Witney.

Further particulars can be obtained at the undermentioned address, where applications (accompanied by not less than two recent testimonials as to qualifications), stating remuneration required, must be delivered, not later than the 7th day of December next.

ROBERT F. CUTHBERT,
Clerk.

28 Bridge-street, Witney.
November 29, 1918. (3,918)

COUNTY BOROUGH OF BARROW-IN-FURNESS.
TEMPORARY ENGINEERING ASSISTANT.

Wanted in the Borough Engineer and Surveyor's Office, a temporary Engineering Assistant. Applications, in candidate's own handwriting, stating age and salary required, and giving full particulars as to experience, and accompanied by copies of not more than three recent testimonials, to be sent to the undersigned not later than twelve o'clock noon, on Monday, the 25th November, 1918.

Canvassing will disqualify.

W. C. PERSEY,
Borough Engineer and Surveyor.

Town Hall, Barrow-in-Furness.
November 12, 1918. (3,912)

Without *Painted* Interior Walls the Nation's New Houses cannot fully satisfy their Tenants.

For outside and inside woodwork.

WALLS painted with Matone can be *scrubbed* without impairing their colour or velvet-flat surface. Strongest sunlight will not fade Matone Colours. Matone finish is practically permanent and minimises maintenance and repair, because it outlives wall-paper or distemper, retains its beauty to the end and is then easily renewable by **one** coat of Matone. Comparison of prime costs and upkeep over a period proves indisputably that *Matoned walls cost less than papered or distempered walls.*

Adopt this simple standardised Paint system for your Housing plans:—

For inside walls.

Matone, washable flat oil paint for inside walls in white and 27 colours.

Pompeian Paint, ready for use on outside and inside woodwork in white and 16 colours.

Lustro varnish stain for floors, in 7 natural wood effects.

Write for comprehensive colour folder, particulars and specimen colour schemes

For floors.

Berger Paints
for Housing schemes

Lewis Berger & Sons, Ltd.,
Makers of Colours, Paints, & Varnishes,
HOMERTON, LONDON, E.9.

Branches:—Liverpool, Paris, Durban, Cape Town, Bombay, Calcutta, Shanghai, Sydney, Buenos Aires.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. NOVEMBER 29, 1918. No. 1,402.

Minutes of Proceedings.

House Planning in Scotland.

We have always held the opinion that full weight ought to be given to the views of women on the domestic details of the planning of houses for the working classes, and it was with no little interest that we observed the appointment last June by the President of the Scottish Local Government Board of a committee of ladies to report on the subject. Their report, which has just been issued with commendable promptitude, is a document of no little importance, the conclusions of the committee having been reached only after personal inspection of several recently completed housing schemes and interviews with many of the tenants. The committee are unanimous in saying that from the housewife's point of view these schemes are lacking throughout in many essentials and minor improvements that are necessary to comfort, convenience and good home management. With regard to the vexed question of the provision of a "parlour" —which was absent in most of the places visited—it was found that in many cases a bedroom was sacrificed to make up for that omission, even though the arrangement involved the placing of a bed in the living-room. Indeed, the desire for a parlour was found to be universal, and is said to be an essential in the planning of future schemes. The report further emphasises the importance of the scullery. This is really the workshop of the house, and the test of its efficient design is the ease with which the housewife can overtake her work. The report also deals with such practical matters as the larder, bathroom, cooking and heating facilities, ventilation and furniture, and in regard to the last-named matter makes the excellent suggestion that the attention of the Ministry of Reconstruction should be directed, as a post-war measure, to the utilisation of some of the munition factories for the production of standardised furniture specially adapted for use in cottage homes, and the development of labour-saving appliances. The report is one which should certainly be in the hands of all architects and surveyors responsible for the design of after-war housing schemes.

* * * *

The L.C.B. and Housing.

Not long ago we had occasion to point out that, in spite of a general impression to the contrary, comparatively little progress has in fact been made towards securing the actual erection of the 300,000 houses to be provided by the Government's after-war housing scheme. We are now glad to record that Sir Auckland Geddes has signalised his appointment as President of the Local Government Board by the issue of a circular emphasising the public health aspect of good housing. This is the real answer to that small and diminishing section of the community that still voices the opinion that no housing scheme is in any circumstances justified unless it can be run on an "economic" basis. We have consistently pointed out that the health of the community cannot be considered in terms of £ s. d., and while we agree that ultimately economic conditions as regards wages ought to be so adjusted as to put decent housing accommodation within the reach of every man—even though he has a large family—we cannot accept the view that, until that happy time arrives, the Government and the local authorities should remain inactive. Sir Auckland Geddes evidently intends to speed up the laggards, for in the circular to which we refer he presses for information as to the precise intentions of each local authority, and how far he can count upon them to provide the houses which it will be necessary to erect at the conclusion of the war. So far as public utility societies, employers, landowners, or other forms of private enterprise may prove willing to provide some of these houses at an early date, the necessity for action by the local authority would be reduced, but these agencies may not be able to do much in the early stages of demobilisation, and may not therefore be effective in meeting the demand which may arise for the immediate putting in hand of schemes. It is essential that the President should be in a position to advise the Government as to whether the local authorities can be relied upon to provide the necessary houses or whether other measures must be taken to ensure their provision.

* * * *

Street Cleaning and Refuse Disposal.

Among the subjects considered by the annual convention of the American Society of Municipal Improvements, which was held at Buffalo last month, not the least important was that of probable future developments in methods of street cleaning. This is a service which has made great strides in recent years. Originally undertaken in order to promote public comfort and convenience, it is now recognised as having a direct influence on public health. But if a gradual change of motive is a matter of past history, there can be no doubt that the future will witness an even greater change of method. The special committee which reported to the meeting to which we have referred pointed out that the principal features of this change are the substitution of motor vehicles for animal power and of flushing for dry sweeping. But other new factors will have to be considered in the near future. For example, it is to be hoped that the spirit of economy which has been evoked by the war will be kept alive and fostered in the days of peace. If this is done, the cleansing departments of our local authorities will be concerned with the problems of waste utilisation at least as much as with those of destruction and disposal. Again, the saving by individuals of many articles which formerly were consigned to the refuse bin is bound to make a difference in the character of the subjects available for disposal, and this fact must be borne well in mind in the erection of new plant. In short, the future is difficult to forecast, and wise authorities will for the present proceed with caution.

* * * *

Local Authorities and their Officials.

In a recent issue of our contemporary, *Engineering News-Record* of New York, there appears an interesting note touching upon the retirement of Mr. C. H. Cooper, after forty years' service as borough engineer and surveyor of Wimbledon. It will be remembered that the council recorded on the minutes its recognition of Mr. Cooper's work, and in addition conferred on him the honour of the freedom of the borough and appointed him to act in a consulting capacity. Our contemporary laments the fact that similar graceful acts on the part of local authorities are not so frequent in America as they are in this country. This may be so; but even here the spirit shown by the Wimbledon Corporation is only too rare. Indeed, the general tendency is to depreciate the value of the services rendered to the community by municipal engineers, and it is only in rare instances that they are appraised at their true value. While recognition of long and faithful service like that accorded to Mr. Cooper by the Wimbledon Council is always matter for gratification, municipal engineers as a body would, we are sure, be still more gratified by a more general and generous appreciation of their work during the currency of their appointments.

* * * *

Dublin's Refuse Disposal Problem.

The Dublin City Council are faced with the consideration, as an imperative municipal undertaking, of a scheme for the disposal of the city's refuse, this having become pressing owing to the practical completion of Fairview Park, in Clontarf, which has been formed by the filling in of the sloblands with refuse. This was planned by one of the assistant city engineers, Mr. George Harty, and though that area is filled in the completion of the scheme for the park has been postponed owing to the exigencies of the war. The city surveyor and engineer, Mr. Buckley, has in these circumstances come to the rescue of the City Cleansing Com-

mittee with two alternative proposals. The first, we are informed by a writer in a Dublin paper, was to acquire a large section of the foreshore outside the Great Northern Railway embankment, cutting out the sea by means of a rubble-faced sloping wall running from the North Wall extension to the Clontarf-road. The estimated cost of the necessary construction works for enclosing 560 acres is £41,000. The alternative scheme, which was suggested by the Cleansing Committee rather than devised by Mr. Buckley himself, is a proposal for dealing with 330 acres of slobland, which would be enclosed by a retaining wall running from the end of Tolk Quay across to the Clontarf Strand-road. The estimated cost of this scheme is £33,000. The first of these schemes, it is stated, would solve the city's refuse disposal problem for considerably over a hundred years, and the second for between sixty and seventy years. Objections to one or the other or both will presumably be raised by the people of Clontarf, on the ground of threatened amenities, but it is to be hoped that this will be eventually overcome in a manner satisfactory to all parties. If one of the schemes is adopted, as it should be, Dublin will be fortunate in being in a position to settle its dust disposal difficulty upon lines which would be equally economical and utilitarian.

MUNICIPAL ENGINEERING IN SOUTH AFRICA.

CAPE TOWN ACTIVITIES.

There are 228 miles of paved roads and 281 miles of footways maintained by the city council of Cape Town, the total area being 4,588,000 sq. yds. The cost of maintenance works out at less than 3d. per square yard. Nearly 50 per cent of the water-bound macadam roads are under tar.

There are over 500,000 sq. yds. of ironstone gravel roads, and the city engineer and surveyor, Mr. D. E. Lloyd Davies, M.INST.C.E., in his last issued annual report, states that these highways are becoming troublesome to maintain owing to the increasing intensity of traffic and the difficulty of procuring good gravel. He adds that some 10,000 sq. yds. of water-bound macadam roads with excessive gradients have been converted to random sett pavement. A demand for better roads has followed closely the increase in high-speed vehicles, and in this connection he remarks: "Large sums of money have been expended by the great cities of the world during the last ten years to make their main roads suitable to carry high-speed traffic, and it is unfortunate that Cape Town is for the moment unable to advance with the times in this respect. Taking the main roads as a whole their condition is gradually improving, notwithstanding the severity of the climatic conditions and traffic, but the almost incessant repairs are irritating to road users, and the annual outlay is disproportionate to that spent on the secondary roads."

CLEANSING SERVICES.

The cost of street cleansing is about £80 per mile, which Mr. Lloyd Davies suggests is a very reasonable figure if compared with the average cost in Europe for roads of similar condition.

Much more attention has been given to the cleansing of lanes in the poorer quarters, but the habits of the residents render such work disheartening, as frequently a lane is in a deplorable condition a few hours after it has been thoroughly swept.

Owing to the shortage of water during the summer months, street watering has been carried out with difficulty; in fact salt water had to be transported from Cape Town to as far as Claremont to maintain the service.

A nuisance from catchpits became evident for a short period during the drought, and a solution of the difficulty was found by increasing the service and confining these operations to night time.

A change has been instituted in the system of house refuse collection, the bins being collected from the houses instead of from the streets as heretofore. Although this method is more expensive, the streets and lanes are cleaner, as many of the bins were placed in the streets before the hour of collection and caused a nuisance.

Removals under the conservancy method have been carried out systematically, and the number of complaints has been reduced to a minimum. The cost per removal is under 6d., the charge in other South African towns being 1s.

WATER SUPPLY AND MAIN DRAINAGE.

Mr. Lloyd Davies refers to a scheme for augmenting the water supply of Cape Town by the adoption of what is known as the Steenbras source, and mentions that at the time of writing the city council's proposals had been placed before the ratepayers for their sanction of a loan amounting in the aggregate to £850,000, to enable the works to be carried out.

Mr. Lloyd Davies reports marked progress with the Southern Suburban Main Drainage Scheme, and he states that from the results of the contracts already let and the cost of the work actually completed, there appears to be no doubt that the scheme will, with careful management, be carried out within the estimate of £500,000, notwithstanding the abnormal conditions.

STABLES AND WORKSHOPS.

The municipal stables and workshops are now administered on business lines and balance sheets showing the results of the year's work are prepared. By the new methods much overlapping is avoided, and economy maintained. Both the council's and hired cartage are now handled by the stable manager.

TOWN PLANNING.

The measures that have to be taken to obtain legal authority to proceed with town planning on a comprehensive scale have not yet matured, and nothing of a tangible nature can be done until the necessary amplifications of the Municipal Ordinance are promulgated. A letter was received from the Provincial Administration, saying that the administration could not introduce legislation. The council are therefore endeavouring by the regulations which have been framed governing the subdivision of new estates to provide certain powers which, while admittedly insufficient to enable any municipal body effectively to deal with such an important subject as town planning, may yet be of value in improving the subdivision of new estates, and preventing the creation of slum areas and congestion of buildings in such new areas.

BUILDING INDUSTRY COMMITTEE.

PROTEST BY THE INSTITUTION OF MUNICIPAL ENGINEERS.

The following letter asking for representation on the Central Committee has been sent to the Building Industry Committee by the Secretary of the Institution of Municipal Engineers.

The Secretary,
Building Industry Committee,
Ministry of Reconstruction, S.W. 1.

Sir,—I note that your committee have recommended that a Central Building Industry Committee be appointed, and that certain bodies be asked to nominate members. It would appear that while these are to be nominated by bodies representing county and local authorities, by professional and quasi-professional societies, and by certain trade organisations, no opportunity is afforded to a society such as the Institution of Municipal Engineers, which represents, on the engineering and constructional side, some hundreds of local authorities. Practically every building erected throughout the country is under the supervision of a municipal engineer, and municipal engineers will be responsible for the design and execution of the great majority of the housing schemes now projected.

I would desire respectfully to urge upon your committee the wisdom of extending nominations to bodies directly representative of municipal engineering. I cannot, of course, speak for other bodies; but I can assure you that, as regards the Institution of Municipal Engineers, the co-operation of its members would be of no small value in the deliberations of the committee.

I am, your obedient servant,
B. Wyand,
Secretary.

39 Victoria-street, London, S.W. 1.
November 20, 1918.

INSTITUTION OF CIVIL ENGINEERS.

ROADS PAPERS AT NEXT WEEK'S MEETING.

At a meeting of the Institution of Civil Engineers to be held on Tuesday next, the 3rd prox., at 5.30 p.m., the following papers will be presented for discussion:—

"Road-Corrugation," by E. L. Leeming, M.SC.TECH., ASSOC.M.INST.C.E.

"Investigations in the Structure of Road Surfaces," by Francis Wood, M.INST.C.E.

"Notes on Road Construction and Maintenance," by T. B. Bower, ASSOC.M.INST.C.E.

Trees in Streets.—The subject of trees in thoroughfares was before the Cardiff Public Works Committee recently, it being reported that a memorial had been asking that unnecessary trees in a number of streets should be removed and used for firewood and carpentry in the council schools. It was pointed out that the roots of the trees dislocated paving stones, interfered with the sewers, and let rats into the cellars. The trees were also a nuisance and a danger because boys threw stones at the acorns and chestnuts, and people were struck, one lady "having been reported to have lost her eyesight." The committee decided not to take any action.

Shanghai's Sewage Disposal and Water Supply Problem.

PROF. GILBERT FOWLER'S INVESTIGATION AND REPORT.

A growing demand for water closets and for a water carriage system of sewage disposal has brought the authorities of Shanghai face to face with a problem bristling with difficulties of an unusual kind.

Shanghai takes its water from the river Whangpoo, but unlike other populous communities which depend for their supplies on the rivers upon which they are situated the point of intake is not at some unpolluted source at a higher elevation than the town, but—for reasons partly engineering and partly political—below the city, where it appears the polluting agencies are such that a reasonably pure water is obtainable only on the flood tide. According to information supplied by the Whangpoo Conservancy Board, the nett flow of the river varies from zero to a maximum of 10,800 million gallons per day with a mean volume of 3,780 millions. Under certain circumstances, therefore, the Whangpoo is practically a stationary pool where there is mixing, but no nett flow in either direction, and there will be general agreement with Prof. Gilbert Fowler, D.Sc., F.I.C., who has been called in to advise the municipality, when he asserts that such a state of affairs makes even a small addition of sewage effluent undesirable, and that so long as the water supply of Shanghai is taken from the Whangpoo no admission of unpurified sewage to the river on any extended scale should be countenanced..

PROVISION FOR FIFTY YEARS.

Prof. Fowler, who was formerly consulting bacteriologist to the Corporation of Manchester, is now Professor of Applied Chemistry at the Indian Institute of Science, and his report—just to hand—on the difficulties confronting the authorities of Shanghai is an altogether interesting document. His first endeavour has been to see the problem as a whole and to obtain a correct view point, and he commences by saying that any mere temporary palliatives are to be avoided, adding that whatever it is decided to do immediately or in the near future should be part of a well-thought-out plan, which will meet the needs of the whole of Shanghai, including the French Settlement and the Chinese city, for the next fifty years. "It has been almost invariably the case in the past," he observes, "that municipalities have underestimated their future requirements, even if they have given serious thought to the future at all. In consequence grave difficulties are encountered in adapting limited designs to extended needs." Shanghai, he points out, standing as it does as a centre point in the stream of commerce below East and West, is likely greatly to increase in the future, and the present difficulties will certainly not diminish with time.

OUTLINE OF RECOMMENDATIONS.

Any comprehensive scheme for dealing with the sewage of the city must, in Prof. Fowler's view, look forward to the ultimate inoffensive disposal of at least 50,000,000 gallons of sewage of average strength, and this must include a system of closed sewers quite distinct from the present sewers, which are constructed only for the purpose of carrying off the rain water. The land being entirely flat, discharge by gravitation is out of the question, and ejectors—to the number of about forty—would therefore have to be made use of for lifting the sewage. As regards disposal, Prof. Fowler suggests that the activated sludge process would serve both the sanitary and economic requirements met with in Chinese cities, allowing as it does the employment of the water carriage system without loss of the manurial value of the sewage—a matter of vital importance under the conditions of agricultural life in China, where sewage matter is in universal use as a fertiliser. Pending the installation of a separate system of sewers he recommends, as a means of guarding against the danger of an extension of the water supply pollution, that the contents of the present cesspools should be removed by tank carts to an area of land which could afterwards be utilised as a site for treatment works. He adds that a portion of the contents of these tanks could be applied to the land under expert direction in order to encourage the neighbouring farmers to remove it, while another portion might be used for experiments to obtain data for the proposed works and especially to determine the value of the sludge as a manure.

With respect to the water supply, Prof. Fowler states that the water of the Yangtze river, taken several miles above its junction with the Whangpoo, is better than that taken below Shanghai, but is still subject to pollution, and he urges that before any scheme is adopted for bringing Yangtze water to the city extended chemical and bacteriological studies of the two rivers under all conditions of tide and season are necessary. He recommends that under present conditions measures should be taken to increase the output and maintain or improve the quality of the water supplied by the present works by the application of suitable chemical treatment. "In this direction," he remarks, "Shanghai would be merely following in the footsteps of London, which has had to be content with a source of water which is not ideal, but which, owing to the masterly work of Dr. Houston and his staff, is provided with a supply entirely free from danger."

OFFENSIVE CREEKS.

Lastly, Prof. Fowler offers some suggestions for overcoming the nuisance caused by the creeks which intersect Shanghai in every direction, and which are in immediate communication with the Whangpoo. Where these creeks travel through the populated areas, they all show signs of pollution, many of them in fact appearing to be nothing but open sewage carriers, suffering from the effects of pervious sides and bottom and a poor hydraulic mean depth. In congested areas they are greatly polluted, receiving all bath, laundry and sink waste, washings from streets, public urinals and latrines and Chinese alleyways, as well as numerous untreated trade wastes. Prof. Fowler's idea is that all creeks through populated areas should be cleared out and a smooth invert of cement provided with, if possible, a defined fall towards the river or large tributory creek. In certain cases culverting might be necessary, and whether inverted or culverted the provision of catch-pits and screens at the outlets would, it is added, be found advantageous. As a means of keeping the creeks sweet the tidal water in them, could, when conditions were favourable, be held up in them at high tide by means of flushing gates and released at half tide; and in exceptional cases an addition of chloride of lime might be useful to abate a local nuisance or prevent fungoid growth.

"I can speak from experience," says Prof. Fowler, "of the efficiency of providing a smooth invert and of periodical additions of chloride of lime, from having been responsible for many years for the condition of the Gore Brook in Manchester, which, though heavily polluted with sewage effluent, flowed of necessity through two of Manchester's large public parks. Pending the interception of the sewage the nuisance was greatly minimised by inverting the bottom with cement concrete and treatment with chloride of lime in the summer time."

Concluding his report, Prof. Fowler proposes the formation in the interests of economy and general efficiency of a Joint Board for Water Supply and Sewage Disposal, consisting of members representing the Foreign Settlements and the Chinese City together with such bodies as the Whangpoo Conservancy Board, and the Chamber of Commerce of Shanghai. There is reason to believe, he says, that such a proposition would be favourably received by the French authorities, and he suggests the advisability of the municipal engineer, Mr. Charles Godfrey, M.Inst.C.E., conferring informally with the technical advisers of the French Settlement before beginning to prepare his plans in detail. He leaves untouched in his report the important question of finance, but he suggests that the expenditure which his proposals entail is not out of proportion to the resources of the community, and will not be more than is cheerfully faced by populations whose resources are even less than those of Shanghai.

SALVAGE EXHIBITION.

NATIONAL COUNCIL'S INVITATION TO LOCAL AUTHORITIES.

In connection with the Savoy Fair to be held at the Savoy Hotel, London, from December 4th-7th, the National Salvage Council and the Salvage Department of the War Office have organised an exhibition of special value to members of local authorities and municipal officers interested in salvage. Numerous specimens of salved materials and of the products and by-products which can be derived therefrom will be exhibited.

For the benefit of municipalities who may take the opportunity of sending delegates to inspect this display, a technical adviser from the National Salvage Council will be in attendance from 10 to 12 o'clock on the mornings of December 5th and 6th, and will be pleased to explain the exhibits to members of local authorities and municipal officers.

The War and Public Health.—Post-war developments in connection with public health are to be considered at a three days' conference which the Royal Sanitary Institute are arranging to hold in London in March next.

C

Women and House Planning.

SCOTTISH L.C.B. COMMITTEE'S REPORT AND RECOMMENDATIONS.

The housewife's view on the planning and interior arrangement of houses is set out in a report of a Women's Committee appointed by the Local Government Board for Scotland to consider these questions.

In the course of their investigations the members of the committee visited housing schemes in various industrial centres and rural districts. "All the houses in the industrial areas have," the report states, "been erected since the outbreak of war, and while they have for the most part been built for the purpose of accommodating an influx of munition, shipyard, and Admiralty workers in the various districts, they are nevertheless permanent, and may fairly be taken as examples of the types and class of house in which it is hoped the working classes will be housed in the future. This initial endeavour to meet the clamant demand for houses deserves, and is given, fullest commendation. Each scheme embodies in degree the requirements of modern housing. The site has been well chosen and the lay-out is spacious, and has had evident care. Each house has separate working, living, and sleeping-room accommodation, sanitation, hot and cold water, bath and garden space. But from the housewife's point of view there are lacking throughout essentials and many minor improvements all necessary to comfort, convenience and good home management."

LAY-OUT AND TYPE OF HOUSE.

The committee regard the question of lay-out as one which must be decided by local conditions, but they urge that there should be provision in every scheme of size for the more recent developments in social welfare, as, for example, crèche or clinic, social and educational centres and playing spaces.

They consider that the type of house is so largely a question of individual preference that as much variety as possible should be allowed in each scheme for the arrangement of the rooms. The single or flatted type may be preferred where there are little children needing constant care and supervision, and they agree that a certain proportion of the houses should be of this design. The two-storey type is more favoured where the family is grown up. The terrace type is more economical, and in some areas has proved successful, but there is always associated with it the difficulty of access to the back doors of the intermediate houses, and the necessary back lane has many objections.

The committee were not agreeably impressed with the closing of the ends of the roads by houses, as this leads to some houses overlooking others, and also cuts off any possibility of a distant view, and gives a very closed-in effect.

Open spaces, verges, centre plots, and other pieces of common ground should, it is recommended, be taken over by the local authorities and kept in order by them.

ACCOMMODATION AND DIMENSIONS.

The committee noted with regret the failure to provide in any of the schemes sufficient accommodation for a large family, say, five to eight children, and they are agreed that in every scheme provision for larger houses should be made. More space, they suggest, is required every way in the living and sleeping-rooms, sculleries, passages, landings, and staircases; and they propose that, in addition to living-room, the sleeping accommodation should be arranged on the basis of one bedroom for three members at most of the family, no hard-and-fast rule obviously being applicable since so much will depend on three determining factors—viz., size of room, age, and sex of occupants. It would also be necessary to be much more generous in this large family house with presses and shelving accommodation if the family's belongings are to be kept tidy.

The following are suggested as minimum dimensions for the various rooms:—

Living-room (in house without parlour), 15 ft. 6 in. by 12 ft. 6 in., equals 194 sq. ft.; living-room (in house with parlour). 15 ft. by 12 ft., equals 180 sq. ft.; parlour, 12 ft. by 12 ft.. equals 144 sq. ft.; scullery, 10 ft. by 9 ft., equals 90 sq. ft.; scullery (where washhouse outside), 10 ft. by 8 ft., equals 80 sq. ft.; larder, 5 ft. by 3 ft., equals 15 sq. ft.; coal cellar, 4 ft. by 3 ft., equals 12 sq. ft.; bathroom, 8 ft. 6 in. by 5 ft. 3 in., equals 45 sq. ft.

In the whole of the schemes visited the height of the ceilings is 8 ft. 6 in. on the ground floor, and 8 ft. on the upper floor, and the committee believe this meets with the approval of experts in modern hygiene.

LIVING-ROOM, PARLOUR AND BEDROOMS.

The living-room must have sun and ample floor space, general comfort, and good artificial lighting; and whatever accessories can be provided to meet the many little needs of home life are desirable.

The desire for a parlour is universal, and the committee consider that in future schemes the provision of a parlour, in addition to the living-room, should be recognised as essential. It can be situated upstairs if need be.

In planning the bedrooms the committee agree with the dimensions suggested by Mr. Walker Smith, in the Memorandum by the Scottish Local Government Board, dated July last—viz.: "The minimum allowance for sleeping space should be 500 cub. ft. for an adult, and 250 cub. ft. for each child under ten years of age. The largest bedroom should be capable of accommodating two adults and two children. No bedroom should have less than 80 ft. of floor area."

SCULLERIES AND LAUNDRY FACILITIES.

The scullery is described by the committee as the workshop of the house. Not to be altogether sunless, it should face east, and should lead directly out of the living-room, or be accessible immediately outside the door of that apartment.

The washtub and sink, planned to give the maximum of elbow room, should be placed in the window recess of the scullery, and not, as in some houses, next the wall, where the space is confined. It is suggested that the dimensions of the washtub should be approximately 24 in. by 20 in. by 15 in., and of the sink 24 in. by 20 in. by 10 in., and that the height from the floor be 3 ft.; that the top of the washtub be furnished with a drip board, and that a second drip board or shelf be placed alongside, and that provision be made for fastening the wringer.

The recommendations with regard to shelving in the sculleries are as follows: There should be from 25 ft. to 30 ft. of 11-in. shelving in each scullery; the first shelf to be 4 ft. 6 in. from the floor level, the second 15 in. higher, and the top shelf, which could be used for storage, 15 in. below the ceiling. There should also be provided under the first shelf a utensil board, 3-in. wide, at least 10 ft. long, and furnished with hooks.

As regards clothes boilers, it is recommended that these should be about 20 gallons' capacity, have two taps (one above the boiler for filling and the other for drawing off the water), and be fitted with an arrangement for taking the steam into the flue. Where gas is available, gas heating for the boiler is both cleanly and convenient. Two laundry spars attached to pulleys should be fixed on the ceiling extending the full length of the scullery.

LARDER AND PRESSES.

The larder, it is recommended, should face north or east. enter off the scullery, and be fitted with at least two wooden shelves and one slate or cement slab.

Ample press accommodation is regarded as most essential, and the committee suggest two good presses in the living-room, and one in the parlour.

BATHROOM AND WATER CLOSET.

The committee took evidence from a number of occupiers as to whether they preferred this apartment to be on the ground floor or on the bedroom flat, and there was considerable difference of opinion. On the whole the committee consider, especially where there is a number of small children, that the most convenient situation is on the ground floor; but they recommend that it enter directly off the lobby and not through the living room or off the scullery. Its minimum area should be 45 sq. ft., with a clear passageway of at least 3 ft. in front of the bath; the size of the bath to be 5 ft. 6 in. by 2 ft. 3 in. They are also of opinion that a wash-hand basin should be provided in this apartment.

COOKING AND HEATING FACILITIES.

Where gas is available, the committee recommend a gas cooker in the scullery so as to dispense with a range in the living-room, in which it would be sufficient to have an interior grate with back boiler. The committee suggest in passing that it would be very desirable to have some scientific inquiry into the relative merits of the different grates and ranges as regards their heating and warming capacity (both for water and for food) in relation to their consumption of coal.

LOBBY AND STAIR.

The entrance lobby should be roomy, have a recess for coats and hats, and the very necessary space for bicycle or perambulator. An inner door is always desirable. and for exposed positions very necessary, so also is a storm-board in the front door, while a very useful provision is a sunk space for a mat.

The stair must be wide enough for the easy removal of furniture, and a handrail should in every case be provided.

WINDOWS AND VENTILATION.

The committee are of opinion that sash windows are to be preferred for general use, and that on the upper floors the lower sash should be hinged to open inwards for cleaning.

Because of the vital need of clean air, especially for little children, the committee urge the provision of this simple device—that one window in every room, including bathroom and scullery, be constructed so that at the meeting of the rails the lower sash project 4 in. beyond the upper sash, thereby enabling a gentle continuous upward current of air to percolate between the two sashes; a safety fastener to be provided.

INTERNAL FINISHINGS.

Approval is expressed in the report in regard to what has been done towards simplification of internal finishings. Dealing with the treatment of walls, the committee state that, while some tenants like wallpaper, generally distemper is preferred provided good tints are used and that the distemper is really washable. As regards flooring, it is recommended that concrete should be used only for flooring sculleries and other offices.

FURNITURE.

In their inspection of the houses at the various sites the committee have given consideration to furniture and fitments, and their attention has been focussed on the difficulty of combining the present type of furniture with the newer types of houses. Among other things they suggest that the attention of the Ministry of Reconstruction should be directed, as a post-war measure, to the utilisation of some munition factories for the production of standardised furniture specially adapted for use in cottage homes and the development of labour-saving appliances.

RURAL HOUSES.

With regard to the cottages to be built in rural areas, the committee consider that what they have described as suitable for industrial centres would also be suitable for the country, with some modifications which they proceed to describe.

INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS.

HOLBORN AND MARYLEBONE MEETING PROGRAMME.

A meeting of the Institution of Municipal and County Engineers will be held in the metropolitan district at Holborn and St. Marylebone, on Friday next, the 6th prox., the programme being as under:—

10.30 a.m.—Meet at Holborn Council Offices, 197 High Holborn, W.C. 1, opposite British Museum Tube Station.

11. 0 a.m.—Inspect national kitchen, Endell-street, Shaftesbury-avenue.

11.45 a.m.—Demonstration of street-cleansing machines.

12.45 p.m.—Inspection of paving works in the Borough of Holborn.

1.30 p.m.—Luncheon. Connaught Rooms, Great Queen-street. (Tickets, 4s. each.)

3. 0 p.m.—Inspection of salvage plant, North Wharf, North Wharf-road, Paddington (St. Marylebone Borough Council).

4.45 p.m.—Tea at Holborn Borough Council Offices, by kind invitation of Mrs. Spurrell.

Discussion of the following papers, which will be taken as read:—

(*a*) "Holborn Communal Kitchen and other Municipal Matters," by E. F. Spurrell, borough surveyor, Holborn.

(*b*) "Notes on Organising a Department for the Collection and Disposal of House Refuse During the War," by James Gair, A.M.INST.C.E., highways engineer to the St. Marylebone Borough Council.

5.30 p.m.—A discussion on the education and training of the municipal engineers will be opened by Mr. A. E. Collins, city engineer, Norwich.

NORTH-WESTERN DISTRICT.

Mr. C. Brownridge (Birkenhead) presided at a meeting of the North-Western district of the Institution of Municipal and County Engineers held in Manchester on Saturday last, and there were present members from Manchester, Stretford, Birkenhead, Blackburn, Irlam, Littleborough, Chorley, Failsworth and Bolton.

DISTRICT CHAIRMANSHIP.

A letter was received from Mr. S. S. Platt, resigning the office of district chairman, he having removed to Colwyn Bay on relinquishing his appointment at Rochdale. Tributes of appreciation were paid by the chairman and several members, and the resignation was accepted with expressions of regret, a vote of thanks being at the same time accorded to Mr. Platt for the services he has rendered.

The vacancy was subsequently discussed, and it was resolved unanimously that Lieut.-Colonel E. B. Martin, borough engineer, Salford, be elected chairman of the district.

A VOTE OF CONDOLENCE.

The death of a member, Mr. A. H. Mountain, surveyor to the Barton-on-Irwell Rural District Council, formerly of Withington, was reported, and a vote of condolence with the widow and family was moved by the chairman and carried in silence.

CORRESPONDENCE.

(One man does not see everything.)
—EURIPIDES.

CHRISTMAS HOSPITALITY FOR OVERSEAS TROOPS: AN APPEAL.

To the Editor of THE SURVEYOR.

SIR,—At this time of rejoicing every one of us desires to express gratitude to those who have helped to protect our homes. Thousands of Overseas Troops will be on leave over Christmas, and unable to mingle with their own folk at home. I desire to appeal to your readers on behalf of the Rotary Club of London, acting in conjunction with Lord Beaverbrook and the Hospitality League, to open their homes to one, or preferably two, of these boys. All imaginary difficulties are surmounted. The characters of the guests are vouched for, the railway fares are paid, they will have their food ration books, and if the hostess has servant difficulties, nothing gives the guests greater pleasure than to assist as they were accustomed to do in their own homes. We have to bear in mind that to them even a humble home is as a palace compared with the average hut or canteen.

Will those of your readers who can help please communicate with me by return?

Trusting that this appeal for your fellow countrymen will not be in vain.—Yours, &c.,

W. H. UTZ
(Jenkins Bros., Limited).

6 Great Queen-street,
Kingsway, London, W.C. 2.

[An appeal on similar lines to the above reached us yesterday from Mr. Angus R. Halbrook, director, Lewis Berger & Sons, Limited, Homerton, E., and chairman of the Speakers' Committee of the London Rotary Club.—ED. SURVEYOR.]

LOCAL AUTHORITIES AND HOUSING.

LOCAL GOVERNMENT BOARD PRESIDENT'S ESTIMATE.

Speaking at Basingstoke, Sir Auckland Geddes, President of the Local Government Board, declared that the Government must undertake "a colossal housing scheme." He said: "The figure of one million houses has been mentioned, but I fear more than that will be required, and the cost will be so great that a considerable proportion of it must be borne by State funds. Linked with this must be a development of the health service of the country, and linked with this also, somewhat indirectly and yet very closely, must be a development and fostering of our great basal industry—agriculture."

GARDEN CITIES FOR LONDON.

At a housing conference of representatives of Middlesex public authorities at the Middlesex Guildhall last Friday, Mr. Cuthbert Brown, engineer and surveyor to the Edmonton Urban District Council, urged that garden cities should be laid out to accommodate 50,000 people each in the North, South, East and West of London. The work should be taken in hand by the eighty-seven local authorities within a 15-miles radius of Charing Cross and the seven county councils interested. The cost should be distributed equally over the whole seven county council areas on the basis of the county assessment.

At a meeting of the Royal Society of Arts to be held at John-street, Adelphi, London, W.C., on Wednesday next, the 4th prox., a paper on "Housing After the War" will be read by Mr. B. Seebohm Rowntree. The chair will be taken at 4.30 p.m.

A Long Lawsuit.—Started long before the war began, the cause *Brodie* v. *The Cardiff Corporation* is still proceeding, and on Monday the dispute was again before the House of Lords. Since the proceedings opened (says the *Daily Chronicle*) some of the principal actors have died, and their executors are now prosecuting the appeal. The litigation arose out of a contract for making a dam across the Taff, and the point at issue is whether certain works which, it is claimed, were sanctioned by the corporation's engineer were within or outside the contract price. The contractor has claimed for extras, although there is an absence of orders in writing. There have been diverse decisions by the Courts, although the nett result is an equal division of judicial opinion. The cause will probably occupy some days.

Public Service Motor Vehicles.

DIRECTIONS IN WHICH THEY HAVE PROVED THEIR ECONOMY.

In continuation of the remarks in our issue of the 15th inst., on the subject of the advantages of motor traction over horse haulage for municipal services, we propose now to enumerate some of the directions in which mechanically-driven vehicles can usefully be applied. One of the first that should be mentioned is that of scavenging, including the removal of slop from the streets and roads, and the collection of house refuse. With reference to this service, certain objections have been raised to the use of petrol-driven vehicles, on the ground that the frequent stoppages of the wagon whilst the engine has to be kept running is not economical, and it is suggested that it is better to employ electrically-driven vehicles for this purpose. We have frequently dealt with this subject in the pages of The Surveyor, and the arguments need not be recapitulated. One method of getting over the difficulty would be to collect the slop and house refuse by horse carts or wagons, and take it to a local depot, where it could be transferred to mechanically-driven vehicles for transport to the main depot.

The next service that may be mentioned is that of street watering or sprinkling. This is clearly a work that can be most economically and satisfactorily performed by mechanical vehicles. As a larger volume of water can be carried, the time occupied in returning empty and in the refilling of the tank is considerably lessened, and the rapidity with which the sprinkling can be done causes less inconvenience to the general traffic. Where the gullies are merely flushed, the advantages of a quick-travelling mechanical vehicle are even more apparent.

Another service which can be much better performed by mechanical vehicles is that of the important sanitary duty of cleansing out street gullies. The usual method of doing this work by hand labour with scoops and placing the "muck" on the surface of the carriageway cannot be too strongly condemned, and is a most uneconomical and slow process. There are machines on the market—vacuum street gully cleaners—which are able to travel rapidly from point to point, drawing up into the tanks with which they are fitted the contents of each gully; by means of these what is usually a very unpleasant operation is performed in a few seconds in a most sanitary manner.

Street sweeping with rotary brushes is another service which can be carried out satisfactorily and quickly by mechanically-driven vehicles, some of the more recent types providing for the mud or dust thus swept being, by their own power, emptied into the wagon as the vehicle proceeds on its way. The advantages of such a system over the horse-driven rotary broom machine are obvious. The general traffic is not impeded, the work is more quickly executed, and where long lengths of carriageway surfaces have to be cleansed considerable economy results. Almost the same remarks apply to the gritting or sanding of streets; this work is intermittent, as the necessity for it often arises very suddenly, and it is evident that it can be done better by mechanical vehicles than by horse haulage.

There remains only the question of the general cartage, of which there is always a large amount to be performed, for example, the haulage of macadam and similar materials for the carriageways, and the flags, kerbs, &c., for the footpaths. If works of drainage or sewerage are being carried out by the local authority there are pipes, cement, concrete aggregates, and a host of other things requiring cartage. Very frequently materials have to be carted long distances either from the depots or railway sidings, and it is obvious that mechanical haulage is better and cheaper than horse haulage under such circumstances.

It is needless to press these points any further. We have seen the horse roller give way to the mechanically-driven roller; the time is ripe for the disappearance of the horse-driven vehicle and the substitution of up-to-date mechanically-driven vehicles.

MECHANICAL TRACTION IN STREET CLEANSING WORK.

A sub-committee of the Dundee Cleansing Committee visited Glasgow and Aberdeen recently for the purpose of examining the methods employed by those municipalities in street cleansing operations. In Aberdeen tramway traction is made use of in connection with the work of sweeping, and the sub-committee were so impressed with its effectiveness and economy that on their return they recommended the adoption of the system in Dundee—a recommendation which has since been approved by the Cleansing Committee. The horse brushes at present in use will be utilised.

The purchase of two electrically-propelled tipping wagons of 2-tons carrying capacity was also recommended by the sub-committee. The question of the type of electrical storage battery to be adopted being one on which expert advice would be necessary, it was suggested that on this matter the co-operation of the City Electricity Department should be enlisted. As to probable financial results, the sub-committee considered the estimate of three horses displaced by each electric vehicle might be safely adopted; but in order to keep the figure well within the region of probability, the following estimate had been prepared on the basis of a pair of electric vehicles displacing five horses. Taking as capital outlay: Horse at £200, cart at £30, and a set of harness at £15—£245, against £1,220 as the probable cost of a 2-ton electric tipping wagon, the sub-committee arrived at the following estimate of costs:—

COMPARATIVE RUNNING COSTS.

Horse and Cart.	£ s. d.	£ s. d.
Standing charges:		
Interest on capital at 5 per cent. (on average of nine years) ...		6 2 6
Depreciation:		
On horse, £200 at 12½ per cent....	25 0 0	
On cart and harness, £45 at 7½ per cent.	3 7 6	
		28 7 6
		34 10 0
Maintenance:		
Provender and litter	83 4 0	
Horseshoeing, vet. and stable expenses	16 6 0	
Repairs	5 0 0	
		104 10 0
Annual running costs		139 0 0

Two-ton Electric Vehicle.	£ s. d.	£ s. d.
Standing charges:		
Interest on capital at 5 per cent...		34 0 0
Depreciation at 10 per cent ...		122 0 0
Insurance		10 0 0
		166 0 0
Maintenance:		
Electric current	60 0 0	
Tyres	50 0 0	
Repairs and renewals	50 0 0	
		160 0 0
Annual running costs		326 0 0

SUMMARY.

Horse traction:		
5 horses and carts, at £139 as above	695 0 0	
Add wages of 5 carters, at £153 8s.	767 0 0	
		1,462 0 0
Electric traction:		
2 vehicles, at £324, as above ...	648 0 0	
Add wages of 4 men, at £153 8s. ...	613 12 0	
		1,261 12 0
Estimated annual saving on electric traction		£200 8 0

The sub-committee also reported on the question of adopting a combined sweeping and loading machine, and added that in the near future an improved system of treatment and disposal of city refuse would have to be adopted, but these questions were left over.

KENT HAULAGE COSTS.

In his annual report, Mr. H. T. Chapman, the county surveyor of Kent, says:—

"No new haulage plant has been purchased during the year, and we have had to carry on with our existing and ancient vehicles which have required frequent and considerable repairs. In consequence we have been compelled to employ somewhat extensively hired vehicles. We have not yet replaced the six new petrol lorries which accompanied the Expeditionary Force in 1914.

"The average daily cost of working a steam roller, including repairs, coal, oil, waste, scarifying tynes, insurance, driver, and attendant is £1 7s. 1d. That of a steam

motor, including all charges, £1 12s. 6d.; and a petrol heavy motor, £2 7s. 1d.

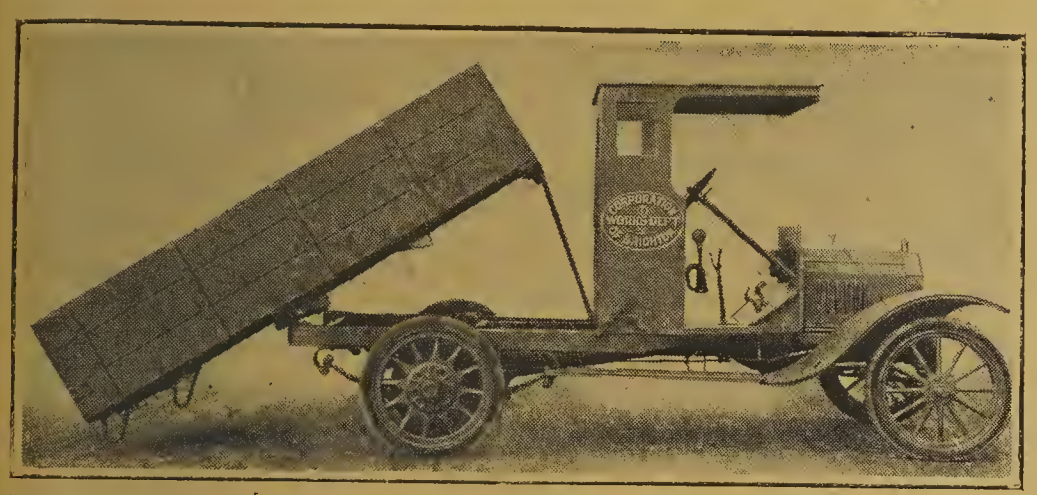
"The total cost of haulage during the year amounted to £20,211, of which £12,995 was in respect of hired team labour and mechanical haulage."

DERBY'S STEAM WAGON.

Mr. John Ward, M.INST.C.E., borough surveyor and waterworks engineer of Derby, has in use in his department a Foden steam wagon, which is occupied principally in conveying ashes from the electricity station to a tip about 1½ miles distant. The vehicle has now been in use a little over two years, and the average cost per mile, including all repairs, but excluding interest and sinking fund, has been about 1s. 4d. per car mile.

WHEN MUNICIPAL MOTORS PAY.

Motor wagons, says Mr. George T. Lynam, M.INST.C.E., borough engineer and surveyor of Burton-on-Trent, are valuable for municipal purposes when circumstances are favourable and they are economical if they can be kept going. Quick means of loading and unloading are necessary, and as a rule long journeys pay better than short ones. If there is sufficient work to keep a wagon going regularly throughout the year it will be found to be a good investment. At Burton-on-Trent, owing to the increases in wages, repairs, fuel, &c., the cost is now about 10d. per ton mile.



[*By courtesy of "The Autocar"*]

(The above illustrates a chassis fitted with Karyton-Eros adaptor and tipping-wagon body, supplied by Moore, of Brighton (1910), Limited, to the Brighton Corporation for the collection of house refuse).

Newton Abbot Urban District Council have agreed to purchase a steam lorry.

Alcester Rural District Council propose to purchase a motor lorry for general hauling and refuse collection.

Richmond Town Council are inviting tenders for two motor fire engines to take the place of existing horse appliances.

The Roads and Bridges Committee of the Holland County Council have resolved to purchase a second-hand motor car.

WATER PURIFICATION AND SEWAGE DISPOSAL WORKS OPERATION.

ENSURING EFFICIENCY IN NEW JERSEY.

The legislature of the State of New Jersey has passed a bill which provides that in future all water-purification plants and all sewage-treatment plants in the State must be in charge of superintendents or operators who hold licences granted under the direction of the State Department of Health. On its introduction in the Legislature the Bill was accompanied by a statement of its purpose which is quoted by *Engineering News-Record* as follows:—

"The purpose of this Bill is to secure the employment of attendants at water-purification and sewage-treatment plants having a higher degree of intelligence and more familiarity with the operation of these plants than is now the case. There are a large number of water-purification plants and sewage-disposal plants now in operation in this State. The experience of the State Department of Health has shown that many of these plants, particularly the smaller ones, are operated in a very unsatisfactory manner. This results, in the case of water-purification plants, in imperfect purification of the water at times, and the consequent exposure of the people who use the water to danger from water-borne diseases. In the case of sewage-treatment plants not properly operated, the streams into which effluents from these plants are discharged are polluted, in some cases to the extent of causing gross nuisance. The unskilful and careless operation of these plants also results in their rapid deterioration, which ultimately entails upon the municipalities owning them the expenditure of funds for repairs and replacements which would not be necessary were the plants properly operated."

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is it not lamentable that in the matter of forestry the British Isles were such a long way behind other European countries before the war? And in order that there may be no recurrence at a critical time of the shortage of timber from which we have been suffering, is it not to be hoped that in the numerous reconstruction schemes which will now have to be undertaken, the question of forestry on scientific and modern lines will not be forgotten?

* * * *

Is it not evident that Ontario is fully alive to the importance of roads when we read that no less than 9,000 miles have been "marked" for improvement and construction? Is it not also interesting to learn that since 1911 the registration of motor cars in that province has doubled, and that at the present time there is one car for every thirty-nine inhabitants? Is not the Government also quite right in predicting that after the war motor-car traffic will rapidly increase and that in order to meet this traffic stronger road foundations—particularly on inter-urban highways—will be required?

* * * *

Is it not very likely, as suggested in an excellent article on "Engineers and Disease Prevention" in the *Times Engineering Supplement* of November, that the present epidemic of influenza may be due to the compulsory stoppage of sanitary engineering works which occurred at the outbreak of the war, and also to the War Office and other Government departments in not securing the best engineering advice for the drainage and water supply of the numerous camps and munition works throughout the country? Is it not to be regretted that the British authorities did not act in the same manner as the Americans, who, "as soon as the United States came into the war, retained the services of the very best civil engineers to look after the sanitation of their cantonments, with the good results which were to have been expected"? When will the Government learn that the best advice is the cheapest and most satisfactory in the end?

* * * *

Is the non-political Press on the right line in advocating motor trunk roads throughout the country to take the largely increased traffic which must be expected when the country settles down to normal conditions of trade? Would it not be well before embarking on these heroic and costly schemes of new arterial and trunk roads to consider seriously the question of how to put our existing roads in such a condition as will make them of sufficient strength and durability to resist the traffic they will undoubtedly be called upon to bear? Moreover, would it not be wise to wait and see in what directions this increased traffic will move before spending gigantic sums of money on new roads?

* * * *

Is it not to be hoped that there may shortly be further legislation with regard to the diameter of the wheels and the width of steel tyres on the heavy motor wagons and tractors which now punish our roads so severely? Have not Colonel Crompton and other experts for some time past held and proved that wheels of small diameter are more damaging to roads than those of larger diameter, and is it not evident that this must be true? Also do not small diameter wheels add considerably to the tractive force required to propel a vehicle? When shall we see some well-thought-out legislation on this important subject?

Municipal Engineers and Superannuation.—At the last meeting of the council of the Institution of Municipal Engineers it was reported that a resolution had been sent to the Secretary of the Departmental Committee on Superannuation intimating the institution's approval of the idea of a non-contributory scheme of superannuation for the officers of local authorities.

Cheap and Effective Lighting.—It is not generally realised how factory lighting has been revolutionised during the past five or six years. The best available lighting prior to 1913 is, by to-day's standards, obsolete and more costly to keep than it is to replace. The new half-watt or gas-filled types of lamps, such as the "Mazda," have made the raw material—light—so cheap that there is no excuse for any but the most adequate and satisfactory illumination—brilliant light, but glareless, well-diffused, effective illumination. It is only under sufficient and properly distributed lighting that workmen can produce at full capacity. Good lighting eliminates accidents, increases the quality and the quantity of output, and conduces to the best of health, spirits and contentment of the workers, and it is the duty of every manufacturer and user of light to see that it is employed in the most effective manner, by using the most efficient lighting equipment.

MUNICIPAL ENGINEERS AND TOWN PLANNING.

MR. CAMPBELL'S SIX POINTS.

At a meeting of the Eastern District of the Institution of Municipal and County Engineers, Mr. Julian Julian, borough surveyor of Cambridge, introduced a discussion on the six points brought forward in Mr. A. H. Campbell's paper on the above subject.

Dealing with the first—on the preparation of town-planning schemes as the essential preliminary to housing—Mr. Julian said the chief argument in favour of this was the fact that during the preliminary stages of a town-planning scheme the land was "bound"—that is to say, the development was hindered by the uncertainty as to whether a proposed building or road would fit in with the scheme as ultimately approved. This holding up of the land would last for several months, and might last for a year or more owing to the various formalities and the actual work involved. Owing to the war development had ceased in most districts, buildings costing over £500 could not be erected without special permission, and the very high cost of work was a further hindrance, and this time of stoppage should be used for the preliminary work of town planning so as to avoid having an additional period of stoppage after the war. Against this it might be urged that during the war the staff of the local authority was seriously depleted, many of the surveyors and assistants being on military service, that those who remained were so fully occupied that they had not the leisure for such work, and further, that many owners and their agents were also away, and it was hardly fair that during their absence, in the public interest, their private property should be dealt with without their co-operation or criticism. He suggested that the first work was the revision of the ordnance maps. The surveyor could in most cases decide without much difficulty what areas should be revised, and this work could not prejudice anyone, and no notices or formal resolutions were needed. If the revision was completed before the end of the war the next stages should be undertaken in those areas where there was urgent need of housing schemes being proceeded with. If there was no such urgent need of housing, the further stages should be delayed. There was sure to be a period, immediately after the war, when materials were only available for urgent work, and during this period surveyors and their assistants would be able to push on with the town-planning schemes, the owners and agents would be available for conferences, and the scheme would probably be well advanced before there was much opportunity for private building to proceed.

With regard to the recognition of the work and protection of municipal engineers in connection with town planning Mr. Julian suggested that in view of the action the National Association of Local Government Officers was taking with reference to superannuation it was doubtful whether any reform such as "security of tenure" should be pressed for at the present time. The prospects of a Superannuation Bill appeared to be more promising, and in all probability superannuation would give some degree of security. If "security" by itself was put forward just now, some people might consider it as an alternative, and the support of the Bill would be divided.

Dealing with the next point—simplification of preliminary procedure—Mr. Julian remarked that the preliminary procedure, as regarded the schemes of local authorities, had been simplified by the Regulations of 1914. It had been suggested that the Local Government Boards had done all they could to simplify the procedure short of preparing an Amending Act. Whether that was correct or not, it must be remembered that the Act of 1909 contemplated that the Local Government Boards should be asked for authority to prepare a scheme, not merely for approval of a scheme (Secs. 54 (2 and 3) and 58 (2)). The procedure in Scotland differed from that in England. In Scotland certain of the notices were not required until a later stage than in England; but in both cases a good deal of work was required by the procedure regulations. Two definite simplifications he would suggest were: (1) Individual notices to tenants should not be required, but notice given in the newspapers; (2) The Valuation Department should assist the local authorities in the preparation of lists of owners, and some of the records as to boundaries of properties, but not necessarily the valuations themselves, should be available for the local authorities. If these were at once drafted, when there had been so few schemes to guide one, either they would be very few of the most general character, or they would include a large proportion of clauses which would have to be varied or excluded by the special provisions. He thought something of the kind was desirable, but he was of opinion that a set of "model clauses" arranged so that all or any of them might be used in a scheme would be more useful. When a larger number of schemes had been approved, those "model clauses" which had been included in nearly all the schemes might be issued as a complete set of "general provisions."

In regard to the proposal to bring all undeveloped building sites in urban areas within the scope or operation of town planning without the necessity of establishing in relation to them a *primâ-facie* case, Mr. Julian said he was unable to judge as to how far amending legislation was necessary. It might be that sufficient control over these small undeveloped areas might be obtained under the existing Act. The following case was probably typical:—In a district mostly built over with houses about twenty to the acre there was a plot of one-tenth acre intended for two houses not yet built on. If this was not included in the general town-planning scheme there was a temptation for the owner to put three houses on the uncontrolled plot and so prejudice his neighbours. If, on the other hand, the plot was included in the scheme, the local authority ought not to insist on only one house being built, even if the general scheme provided for about this density of building. An attempt should be made to include such plots in the scheme; but he suggested that clauses should be drafted to allow development on similar lines to the adjoining property unless there was grave reason to the contrary.

Finally Mr. Julian gave it as his opinion that the proposals for dealing with built-up areas and facilitating the acquisition of land deserved most careful consideration. They were of a character, however, that would require time to develop, and he suggested that the meeting should give a general approval to them, and that members should seek to go ahead with those parts of town planning which were already legalised while waiting for wider powers to deal with other problems which the Town Planning Act of 1909 did not authorise.

NORTH-WESTERN DISTRICT RESOLUTIONS.

At a meeting of the North-Western District of the Institution of Municipal and County Engineers held at Manchester last Saturday, Mr. Campbell's six points were discussed seriatim, and it was eventually moved by the chairman (Mr. C. Brownridge), seconded by Mr. Gooseman (Blackburn), and resolved: "That this meeting is in sympathy generally with the principles set out as conclusions in Mr. Campbell's paper, and that the Central Council be asked to formulate resolutions or clauses to give effect to them."

Supplementary to the above, it was, on the motion of the chairman, seconded by Mr. G. H. Wild (Littleborough), unanimously resolved:—

"That in the opinion of this meeting efficient town planning and the provision of adequate open space, recreation grounds and allotments in connection with dwellings has a direct bearing on the health and welfare of the nation;

"That statutory powers should be given all sanitary authorities to limit by resolution the number of houses to the acre in their district or any part of it;

"That to simplify the acquisition and transfer of land and buildings would have an important bearing on town planning, the execution of needed street improvements and the provision of open spaces in congested areas;

"That legislation is needed to enable sanitary authorities to take land for public purposes at a price based on the Government valuation of the land and buildings, without the necessity of expensive arbitrations;

"That it is advisable statutory powers applicable to the whole country should ensure the provision of more adequate air or open space in connection with houses than is now required by the Model By-laws."

ROAD RESTORATION.

COUNTY COUNCILS ASSOCIATION AND DEMOBILISATION.

The question of the restoration of the roads of the country to their pre-war condition and the relation of such work to the problem of demobilisation were discussed on Wednesday by the Executive Council of the County Councils Association. Eventually it was recommended "that all technical road officials and assistants should be demobilised at the earliest possible moment"; "that county councils should have the same priority in regard to labour as proposed for borough and district councils and for contractors"; "that all existing embargoes on road management, materials, and transport should be entirely removed," and "that the present system of control of materials of transport should be continued only until such embargoes can be removed."

Town-planning Scheme for Prestatyn.—It was decided at the meeting of the Prestatyn Urban District Council on Monday to proceed with a town planning and artisan dwelling scheme.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

REFUSE COLLECTION AND DISPOSAL.

Alcester R.D.C.—The sanitary surveyor, Mr. Cyril B. Machin, has been instructed to carry out by direct labour the scavenging at Bidford-on-Avon.

Exeter T.C.—Complaint was made of a subterranean fire which had been burning for many months in what is known as Sampson's Pit. The place is used as a free tipping place for refuse for the whole city and the gas company. Everything possible, it was stated, had been tried to quench the fire. The city surveyor, Mr. J. Moulding, said the place had been a "tip" for many years, and the fire was caused by spontaneous combustion. The more water that was thrown upon it the longer it would burn until it was burnt out. He did not think there was a man in the city who could name a remedy. He had known similar fires near coal-pits, where the waste from the mines was thrown, and they had to burn themselves out. As to the smell arising, this was not deleterious to health, though disagreeable. He would be glad to adopt any practicable suggestion that could be made for putting an end to the annoyance.

Shrewsbury T.C.—It was reported that, as a result of the collection of waste paper in the borough during the twelve months ending October 30th, the sum of £153 had been handed over to the Red Cross Waste Paper Fund.

ROADS AND MATERIALS.

Cheshire C.C.—The chairman (Colonel Dixon) stated that the total expenditure on the main roads during the year had been £111,362, against an estimate of £150,333. The unspent balance of £38,971 had been put to a suspense account, and he hoped it would be ready for use when material and labour were available. He desired, on behalf of the council, to express their sense of the great work that Mr. Holland (the county surveyor) had done during the past three or four years. His work had been very onerous and hard indeed, and what he had done for the council deserved their praise and congratulation.

East Grinstead R.D.C.—The council have considered the question of making claims against private timber merchants in respect of damage to district roads caused by timber haulage for Government purposes, and the clerk has been instructed to communicate with the Rural District Councils Association with a view to combined action being taken in the interests of local authorities in connection with these claims.

Garstang R.D.C.—With respect to the road at Snow Hill, Scortan, which has been much damaged by timber haulage, it was stated that the necessary steps had been taken to carry out the work or reconstruction.

Kingsbury U.D.C.—A number of roads being reported in a very bad condition caused by traffic in connection with the Roe Green Village scheme, the surveyor, Mr. R. C. Newport, was instructed to carry out the repairs.

Leeds T.C.—It is reported that it will be necessary to spend on highways and tramways £50,000 as soon as after-war conditions permit, with a further £85,000 upon sewerage and new streets.

Lincolnshire C.C.—The council have approved an expenditure of £12,000 for strengthening the Friskney and Wainfleet roads.

Market Drayton U.D.C.—The surveyor, Mr. A. Garratt, reported that up to the present the names of seven different firms, proposing to haul a total of 4,616 tons over roads in the district, had been received. Several members remarked upon the bad condition of certain lengths of roads in the district.—The surveyor said the Road Stone Control Committee would allow only a percentage of granite for repairs, and that, owing to the shortage of labour, he found it extremely difficult to get gravel. Moreover, it was not much use repairing roads with gravel, as it would not stand the modern class of traffic.

Middlesex C.C.—The council have approved the recommendation of the Highways Committee to grant a further war bonus, making £1 in all, to all workmen in the highways department, including men on active service, as from October 2nd last.

Oxfordshire C.C.—The Roads and Bridges Committee reported that the repair of the roads, which had been and still were being damaged by excessive military traffic, was a matter which was giving considerable trouble, and required the constant attention of the county surveyor. Certain roads were being repaired by the military authorities, others were being repaired by the committee under requisitions from the Government authorities, and there were other roads sustaining damage which were still being maintained in the ordinary way as far as circumstances allowed. The council have adopted a resolution protesting against the extravagant rate of wages paid to men engaged in manual labour under the control of the Government department as causing discontent and resentment among roadmen and others. It also affirmed that the practice of paying the contractor a percentage on the total cost, including wages, does not tend to promote either rapid work or economy.

Pickering R.D.C.—With reference to the dangerous state of the Rosedale roads, the surveyor, Mr. S. Russell, reported that arrangements had been made for twenty German prisoners to start work, while a quantity of slag had been released by the authorities.

SEWERAGE AND SEWAGE DISPOSAL.

Alcester R.D.C.—The sanitary surveyor, Mr. Cyril B. Machin, has had instructions to prepare a sewerage and sewage disposal scheme for Bidford-on-Avon, and to construct a storm-water relief sewer at Studley. It is proposed to order additional plant from Messrs. Tangyes, Limited, Birmingham, for sewage works at Alcester.

Consett U.D.C.—The surveyor, Mr. F. Hargreaves, has been instructed to fit up a sludge pump at Crookhall sewage works, in order to permit the tenant of adjoining land to pump the sewage on to his land regularly. The Sewerage Committee pointed out that the initial cost would be £16 or £17, but that this would soon be saved because it would be no longer necessary to have the tanks cleaned out annually.

Dunmow R.D.C.—The sanitary instructor has received instructions to prepare estimates for a sewerage scheme at Hatfield Broad Oak.

East Grinstead R.D.C.—On the suggestion of the surveyor, Mr. C. Turton, the council have decided to resume negotiations for purchase, or obtaining an option to purchase, the necessary land as sites for outfall works in connection with the proposed scheme of sewerage and sewage disposal for the parish of Worth.

Leeds T.C.—It is reported that there is an urgent need for spending of £178,000 upon sewage disposal, with a further estimated expenditure of £269,000 upon the outfall works at Knostrop.

Prestatyn U.D.C.—It was stated at a meeting this week that one of the first things to be taken in hand was the carrying out of the new drainage scheme which had been prepared. This would lead to the erection of a large number of houses for the working class.

WATER, GAS, AND ELECTRICITY.

Ashington U.D.C.—The council are urging the Local Government Board to sanction a loan for laying water mains to link up with the Tynemouth water supply.

Bridge of Allan T.C.—The town council propose to promote a Provisional Order for the purpose of taking over the water supply of the burgh. The supply is at present in the hands of a private company.

Buxton T.C.—The borough surveyor has received instructions to report upon the probable cost of a water storage tank for the sanatorium and destructor works.

Killarney R.D.C.—With respect to the Kellagher water supply scheme, for which a loan has been sanctioned, it is stated that the permit for the necessary materials will be issued without delay.

Knaresborough U.D.C.—It has been agreed to call in an expert to advise the council with respect to the gas undertaking.

Leeds T.C.—It is stated that the improved plant needed for the gasworks will cost in the near future £85,000.

Oldham T.C.—The town council have referred back to the Gas Committee a scheme for installing new gas plant at Higgenshaw. It was stated that the plant had been in operation at Nuneaton for fifteen months, and had given entire satisfaction. One of the proposals was that the inventor should be paid ¼d. per 1,000 cub. ft. of gas made at Higginshaw after the installation of the plant for a period of ten years, after which the town council would have the right to use it free. The cost of the plant is approximately £10,000.

Ripon T.C.—The chairman of the Gas Committee and the manager of the gas undertaking are visiting a number of gasworks for the purpose of inspecting improvements in machinery.

Stirlingshire C.C.—The council propose to effect a further improvement of the Kippen water supply, at an approximate cost of £150.

Tiverton T.C.—An offer by Sir Ian Amory to provide public

electric lighting by making use of water power is being considered by the town council.

Ulverston R.D.C.—The council are considering a proposal to construct a service reservoir at Robin Haw, near Applebury Hill, for the supply of the new village of Flockburgh, in the township of Lower Holker. The estimated cost of the work is £2,500.

MISCELLANEOUS.

Bedwas and Machen U.D.C.—It has been decided to consider the question of providing a cemetery for the whole of the urban area.

Hartlepool T.C.—The borough engineer, Mr. A. P. Horsley, having called attention to the undermining of the sea wall and apron opposite to Galey's Field School, the town council gave instructions for the necessary repairs to be carried out at once.

PERSONAL.

The Freedom of the Paviors' Company has been conferred on Brigadier-General H. P. Maybury, C.B., in recognition of his war services as Director of Roads in France.

Mr. B. Wyand, secretary of the Institution of Municipal Engineers, is, we hear, delivering a lecture, "The Evolution of Chinese Writing: A Pictorial Study," before the Hampstead Antiquarian and Historical Society to-morrow (Saturday). The lecture will be illustrated with sketches by the author.

Mr. F. Hargreaves, surveyor to the Consett Urban District Council, who has been voted an advance of salary, was at the same time complimented by the chairman of the council, Mr. E. J. George, upon the valuable services he has rendered to the district. Mr. Hargreaves, said the speaker, had fulfilled his duties in a thoroughly efficient and satisfactory manner, and his work had been highly beneficial to the town.

Messrs. J. Clarke, assistant county surveyor, Londonderry, O. N. Edwards, assistant surveyor, East Westmorland Rural District Council, G. B. Fairchild, highway surveyor, Hailsham Rural District Council, T. C. Halliday, town engineer, Queenstown, South Africa, F. Hobson, surveyor, Kirkburton Urban District Council, W. Howe, assistant engineering inspector, Road Board, J. Latham, surveyor (late), now on active service, M. Murphy, assistant county surveyor, Cork, and W. R. Rutherford, town surveyor, Lurgan, have been elected members of the Institution of Municipal Engineers. Mr. H. Graham, surveyor, Cockermouth Urban District Council, has been elected an associate member of the same body.

OBITUARY.

Captain Kenneth A. Hayward.

We deeply regret to state that Captain Kenneth A. Hayward, Adjutant, 325th Brigade, R.F.A., only son of Mr. T. W. A. Hayward, M.Inst.C.E., borough engineer of Battersea, and president of the Institution of Municipal and County Engineers, died on Friday last. Captain Hayward, who was twenty-one years of age, joined the Army in May, 1915, as 2nd Lieutenant. He went to France towards the end of 1915, and was wounded at Givenchy in March, 1916. Returning to this country shortly afterwards, he had been on home service ever since, and went to Ireland at the beginning of 1917. Latterly he was stationed at Fermoy, where he died at the Military Hospital from influenza, in the presence of his father, mother and fiancée, Miss Gladys Reid. The remains were conveyed to London on Saturday last, military honours being rendered before leaving Fermoy, Colonel S. H. Page, his Commanding Officer, writes in high terms of Captain Hayward's military qualities. The funeral took place yesterday afternoon, a service at the Baptist Church, Ramsden-road, Balham, preceding the burial at Battersea Rise Cemetery. Captain Hayward was educated at Monkton Coombe College, Bath, and at Dulwich College. When war broke out he was at the London University.

FOR OTHER ADVERTISEMENTS

See End of Paper.

A. M.I.C.E, M.Inst.M. & Cy.E., &c., in responsible position in Home County desires improve position. Sixteen years' first-class experience roads, &c. &c.—Box, 1,678, Offices of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4. (3,936)

SURVEYOR AND ENGINEER to Rural District in Midlands (20 miles from Birmingham) has vacancy for pupil.—Box 1,679, Offices of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4. (3,937)

SURVEYOR'S ASSISTANT (23) desires appointment in Municipal Office. Seven years' experience. Three years as Articled Pupil. Good Draughtsman, Surveying and Levelling. Excellent references.—Box 1,677, Offices of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4.

APPOINTMENTS VACANT.

Official and similar advertisements received up to 4.30 p.m. on Thursdays will be inserted in the following day's issue, *but those responsible for their despatch are recommended to arrange that they shall reach* The Surveyor *office by noon on* Wednesdays *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

SEWAGE WORKS MANAGER.—November 30th—Dorchester Town Council.—Mr. A. G. Symonds, town clerk, Dorchester.

SURVEYOR.—December 3rd.—Barton-upon-Irwell Rural District Council. £370 a year.—Mr. J. W. Whitworth, clerk, Council Offices, Patricroft, Manchester.

INSPECTOR OF NUISANCES.—December 3rd.—Docking Rural District Council. £2 10s. per week.—Mr. J. A. Stoughton, clerk, Fakenham, Norfolk.

INSPECTOR OF NUISANCES.—December 5th.—Godstone Rural District Council. £250 a year.—Mr. C. Phillips, clerk, Council Offices, Oxted.

ARCHITECT FOR HOUSING.—December 7th.—Witney Urban District Council.—Mr. Robert F. Cuthbert, clerk, 28 Bridge-street, Witney, Oxfordshire.

SURVEYOR'S ASSISTANT.—December 7th.—Beddington and Wallington Urban District Council. £200 a year.—Mr. T. Booth, clerk, Council Offices, Wallington.

DEPUTY SURVEYOR.—December 9th.—Aldershot Urban District Council. £150-£200 a year.—Mr. D. Ll. Griffiths, "Permutit" water-softening apparatus.—Mr. G. H. Gisby,

SURVEYOR AND SANITARY INSPECTOR.—December 10th—For small urban district council in Lancashire. £150 a year.—Messrs. Forshaw, Parker and Company, Solicitors, Preston.

SURVEYOR.—December 10th.—Wellingborough Rural District Council. £200 a year.—Mr. W. Jackson, clerk, West End House, Wellingborough.

DISTRICT WATER SUPERINTENDENT.—Sutton Coldfield District of the South Staffs Waterworks Company.—Mr. Fred J. Dixon, engineer-in-chief, 26A Paradise-street, Birmingham.

ASSISTANT SURVEYOR.—Blackwell Rural District Council.—Mr. Henry Silcock, surveyor, 67 Westgate, Mansfield.

SURVEYOR.—Staffordshire Agricultural Executive Committee. £3 per week.—Chief Executive Officer, Estate Office, County Buildings, Stafford.

CHIEF ENGINEER.—February 1st.—Metropolitan Water Board. £2,500 a year.—The Clerk, Metropolitan Water Board, 2 South-place, Finsbury-pavement, London, E.C. 2.

MUNICIPAL CONTRACTS OPEN.

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Buildings.

MERTHYR.—December 31st.—For the completion of fourteen houses.—The Borough Architect, Town Hall, Merthyr.

Engineering: Iron and Steel.

WARE.—December 2nd.—For the supply and fixing of a "Permutit" water-softening apparatus.—Mr. G. H. Gisby, clerk, Union Offices, Ware, Herts.

ISLE OF WIGHT.—December 2nd.—For the construction of tanks in brickwork or concrete for water filtration works and other works.—Mr. H. B. Cullen, surveyor, Rural Council Offices, Brooklands, Wootton, Isle of Wight.

WALSALL.—December 5th.—For the supply and erection of one 500-kw. rotary converter equipment for tramways supply.—Mr. H. A. Howie, manager, Electricity Department, Wolverhampton-street, Walsall.

Roads.

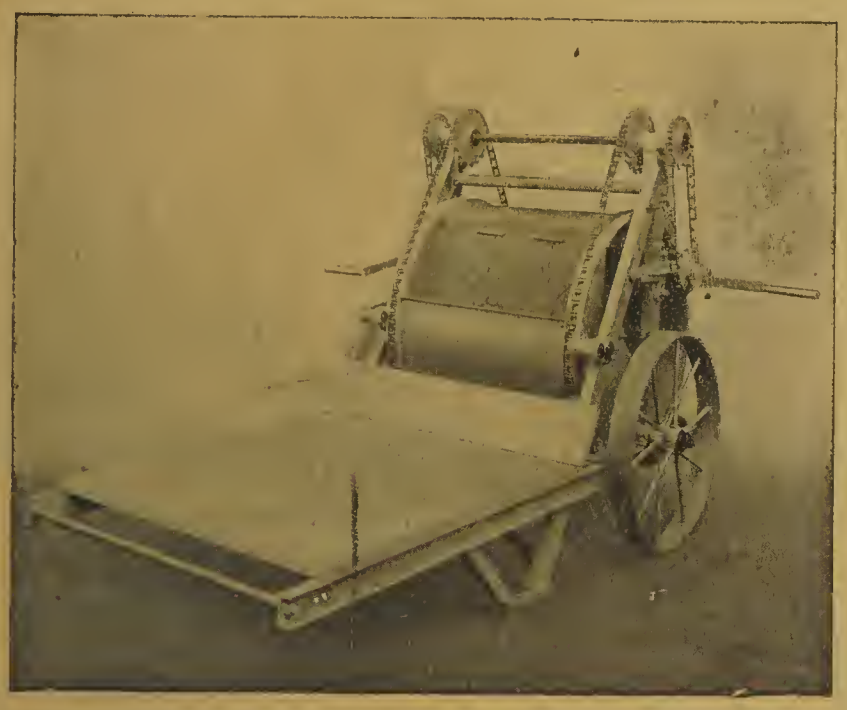
CHELMSFORD.—December 2nd.—For the supply of about 500 tons of Guernsey, Pennaenmawr or Leicester granite broken to 2-in. or 1½-in. gauge, and ¾-in., ½-in., and ¼-in. granite chippings.—The Borough Engineer, Municipal Offices, Chelmsford.

LONDON.—December 9th.—For the supply of granite setts, for use in the tramways department.—The General Manager, London County Council Tramways, 23 Belvedere-road, Lambeth, S.E. 1.

BERKS.—December 17th.—For the supply of broken road materials, gravel and sand.—Mr. A. Langston Yockney, Acting County Surveyor, Shire Hall, Reading.

— THE —

SMITH HAND MIXER



FOR **CONCRETE** OR

TAR MACADAM

A Perfect Mixture obtainable at a much Lower Cost than Mixing by Hand.

Apply for Catalogue No. 3 to—

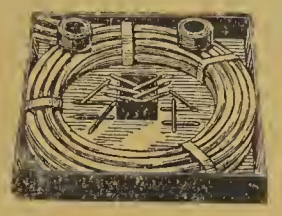
STOTHERT & PITT, Ltd.,

38 VICTORIA ST., LONDON, S.W. 1.

TIGHT BOILER JOINTS

ARE ASSURED BY USING

KEEP A BOX ALWAYS ON HAND.



TRADE JENKINS MARK

Jenkins Bros

The most convenient and economical Jointing Material on the Market.

Made in sizes $\frac{3}{8}$" $\frac{1}{2}$" $\frac{5}{8}$" and $\frac{3}{4}$" diam.

Packed in Boxes of about 5 lb. each size, with plugs and tape enough to make a number of joints.

ALL DONE IN A FEW MINUTES.

JENKINS BROS LTD

6 GREAT QUEEN STREET, KINGSWAY, W.C. 2.

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH

EXPANDED METAL.

EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet.
Mr. Samuel Hutton, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED

(Patentees and Manufacturers of Expanded Metal).

Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.

Works: STRANTON WORKS, WEST HARTLEPOOL.

FORTHCOMING MEETINGS.

Secretaries and others will oblige by sending early notice of dates of forthcoming meetings.

DECEMBER.

3.—Institution of Civil Engineers: Mr. E. L. Leeming on "Road Corrugation"; Mr. Francis Wood on "The Structure of Road Surfaces"; Mr. T. B. Bower on "Road Construction and Maintenance." 5.30 p.m.

4.—Royal Society of Arts: Mr. B. Seebohm Rowntree on "Housing After the War." John-street, Adelphi, W.C. 4.30 p.m.

5.—Association of Managers of Sewage Disposal Works: Annual meeting, 2.30 p.m.; annual dinner, 6.15 p.m. Holborn Restaurant, London.

13.—Institution of Water Engineers: Winter General Meeting, Burlington House, London. 2.15 p.m.

19.—Concrete Institute: Mr. C. F. A. Voysey on "Æsthetic Design in Reinforced Concrete Buildings." Denison House, Westminster. 5.30 p.m.

APPOINTMENTS OPEN.

THE BLACKWELL RURAL DISTRICT COUNCIL.
ASSISTANT SURVEYOR.

The undersigned requires the services of a fully qualified Assistant, with a good all-round knowledge of Surveyor's Office work.

State age, qualifications, references, and salary required, to—

HENRY SILCOCK,
Surveyor,
67 Westgate,
Mansfield.

November 26, 1918. (3,934)

BEDDINGTON AND WALLINGTON URBAN DISTRICT COUNCIL.

The above Council invite applications for the appointment of a Temporary Assistant in the Engineer and Surveyor's Department to assist in the preparation of a Town Planning, Housing, and other schemes.

Applicants must be good draughtsmen and competent Surveyors, and have had some architectural experience. Salary £200 per annum. Applications, stating age, qualifications, and previous experience, together with copies of not more than three recent testimonials, to be delivered to the undersigned not later than Saturday, December 7th, 1918, endorsed "Surveyor's Assistant."

T. BOOTH,
Clerk of the Council.

Council Offices,
Wallington,
Surrey. (3,931)

BARTON-UPON-IRWELL RURAL DISTRICT COUNCIL.
APPOINTMENT OF SURVEYOR.

Applications are invited for the position of Surveyor to the above Council. The person appointed will not be debarred from taking private practice, provided the Council has at all times first claim to his services. Salary and emoluments will not be less than £370 per annum. Candidates must hold a certificate of the Sanitary Institute, or other recognised body, and be fully competent to carry out the duties of a Surveyor as regards sewerage works, sewage disposal, building construction, highways, &c.

Form of application (which must be returned not later than the 3rd of December next) and any further information can be obtained from the undersigned.

Canvassing the Council strictly prohibited.

J. H. WHITWORTH,
Clerk.

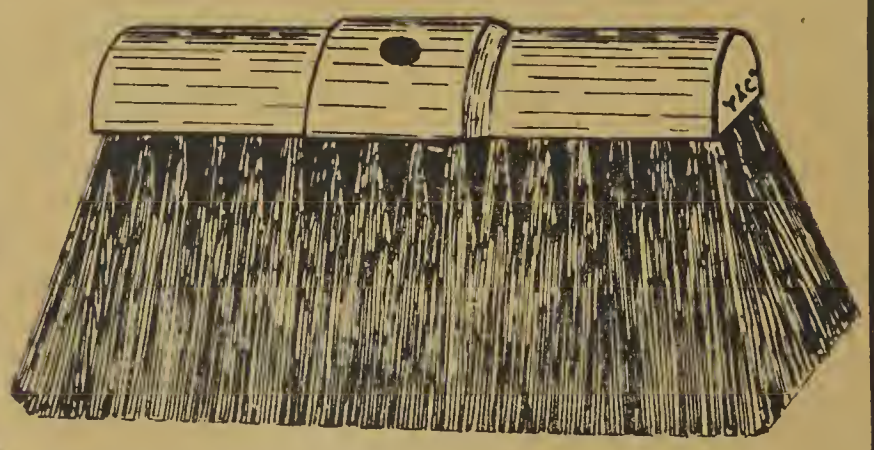
Council Offices,
Patricroft, Manchester.
November 21, 1918. (3,925)

BOROUGH IN WEST RIDING OF YORKSHIRE.—Services of an Engineering Assistant and also of an Architectural Assistant required immediately, for at least six months. Preference given to applicants who have had previous municipal experience.—Applications, stating age, experience, present employment, and salary required, to be forwarded to Box 1,676, Offices of The Surveyor, 24 Bride-lane, Fleet-street, E.C. 4. (3,926)

WANTED, a competent Surveyor and Sanitary Inspector, Collector, &c., for a small Urban District Council in Lancashire. Salary £150.—Applications to be sent, along with three recent testimonials, to Forshaw Parker & Co., Solicitors, Preston, on or before the 10th December next. (3,928)

YATES & CO.,
BOOTHTOWN, HALIFAX
(Established 1857.)

BASS BROOMS.



Prices and samples of Plain and Scavenger Pattern in Pure African, Pure Bahia, African and Bahia and Cane and African mixed, will be gladly sent on application.

ROTARY BROOMS SUPPLIED
AND OLD
ROTARY BROOMS RE-FILLED

NO CONNECTION WITH ANY OTHER FIRM OF SIMILAR NAME

Matoned walls not only cut down, but nearly *cut out* repair cost.

For outside and inside woodwork.

WALLPAPER and distemper need periodical renewing, and labour is costly. The Matone finish, on the other hand, is practically permanent and entails no upkeep expense for a long time. When at last it has to be renewed it needs only *one* Coat of Matone to restore its original beauty and durability. Matone is washable and fadeless—labour-saving and hygienic.

For inside walls.

Specify the Berger housing Paints—3 paints for 3 kinds of surfaces:—

Matone, washable flat oil paint for inside walls in white and 27 colours.

Pompeian Paint, ready for use on outside and inside woodwork in white and 16 colours.

Lustro varnish stain for floors, in 7 natural wood effects.

Write for comprehensive colour folder, particulars and specimen colour schemes, to—

For floors.

Berger Paints
for Housing schemes

Lewis Berger & Sons, Ltd.,
Makers of Colours, Paints, & Varnishes,
HOMERTON, LONDON, E.9.

Branches:—Liverpool, Paris, Durban, Cape Town, Bombay, Calcutta, Shanghai, Sydney, Buenos Aires.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. DECEMBER 6, 1918. No. 1,403.

Minutes of Proceedings.

Street Building Lines.

It has frequently been pointed out that the Public Health (Buildings in Streets) Act, 1888, is defective to this extent that it does not enable the local authority to fix a building line for the earliest buildings erected in a street, so that these will, in effect, frequently fix the building line for the rest of the street, even although they may be built close up to the street boundary. Further difficulties have, at various times, arisen in the practical working of the Act, owing to the way in which it has been interpreted by the courts. The first point on which controversy arose was as to the meaning of the apparently perfectly plain and unequivocal words "house or building on either side thereof" (*R.* v. *Middlesbrough Corporation—Times*, July 7, 1890). The corporation disapproved the plans of a proposed house on the ground that it projected beyond the front main wall of the only other house on the same side of the street, which was some 800 ft. distant; but Lord Coleridge granted a *mandamus* ordering them to approve the plans. And in a subsequent case a house in course of erection at a distance of 300 ft. or 400 ft. from the site of another intended new house was held not to be near enough to fix the building line for the latter (*Ravensthorpe Local Board* v. *Hinchcliffe* [54 J.P., 421]). It is true that this case was complicated by the fact that the front main wall of the first house had only been raised to the height of 5 in. above the ground, and that the court refused (presumably on the principle *de minimis lex non curat*) to recognise this as a front main wall "within the meaning of the Act"; but it is clear that the decision would have been the same even had the wall been raised to its full height, and Lord Justice Fry expressly laid it down that the words "house on either side thereof" mean "a house within some near distance, within some degree of proximity, and not one standing some considerable distance away." It will be seen that this dictum leaves considerable scope for differences of opinion as to what degree of proximity is sufficient; and it has been held that this is a "question of fact" for the magistrates to determine (*Warren* v. *Mustard* [56 J.P., 502]). That case is also interesting because it raised, for the first time, the question whether a house at the corner of two streets is "in" both streets for the purpose of the Act, and this also was relegated to the category of a "question of fact." The defendant in that case had a building plot at the corner of two roads, in one of which a row of cottages had been erected at a distance of about 64 ft. from the defendant's land and set back 8 ft. from the road. He erected a house with its main entrance on the other road, but having a wall abutting on the first road and built right up to the road boundary. The magistrate "found as a fact" that the house was in both roads, and that the cottages were on one side thereof within the meaning of the Act, and they accordingly convicted the defendant of a contravention of the Act, and the conviction was affirmed on appeal. But in a later case a *mandamus* was granted ordering the local authority to approve the plans of some cottages which an owner proposed to erect at a distance of 90 ft. from and projecting beyond a house on the same side of the street. The court did not actually say that the house was not "on one side of" the cottages within the meaning of the Act, but considered that, in the circumstances, it was not necessary that the cottages should be in a line with the house (*R.* v. *Ormesby Local Board* [1894, 43 W.R., 96]). And again in *R.* v. *Falmouth Local Board, ex parte Livesey* (59 J.P., 311) a *mandamus* was granted ordering the board to approve the plans of a house projecting in front of a building only 21 ft. distant. But these cases of *mandamus* can no longer be regarded as precedents, it having been decided in *R.* v. *Eastbourne Corporation* (64 J.P., 724) that a *mandamus* will not be granted to compel a local authority to approve the plans of a building which they have, in good faith, disapproved on the ground that it would contravene the Act. Probably, however, a local authority would have a difficulty in enforcing the Act where the facts are similar to those in the cases referred to. When a building in a street in an urban district or the front thereof has been taken down in order to be rebuilt or altered, the urban authority may prescribe the line in which it is to be rebuilt, under Sec. 155 of the Public Health Act, 1875; but they must compensate the owner for any consequential loss. It has been held that "taken down" in this section means "substantially taken down" (*Attorney-General* v. *Hatch* [57 J.P., 825]). In that case the wall of the ground storey and the whole of the first storey of a house were removed in order to convert these two storeys into a shop, which was also to be extended behind the house. The second storey was not disturbed, but was shored up, first with timber and afterwards with iron girders and brick piers, and it was held that neither the house nor the front thereof had been "taken down" within the meaning of the section. The foregoing powers are only applicable to urban districts, but they may be applied in a rural district by Order of the Local Government Board. As will be seen, they are strictly limited, and give no power to prescribe a general line of buildings in a street, such as, *e.g.*, that possessed by the London County Council under the London Building Act, 1894.

* * * *

Road Problems.

No one competent to express an opinion would deny that if the roads of this country are to be maintained in a condition fit to bear the after-war traffic that will be brought on to them, a vast amount of work will have to be undertaken in the very near future. Many problems remain to be solved, and if these are to be dealt with successfully, engineers must be prepared to approach them from a scientific point of view. In this connection special significance attaches to last Tuesday's meeting of the Institution of Civil Engineers, at which three papers dealing with various questions concerning road construction and maintenance were presented. The first paper was by Mr. E. Leonard Leeming, and dealt with the causes of road corrugation and some suggested remedies. For instance, Mr. Leeming put forward the interesting proposal that where sett or wood paving is used an improvement in the ability to resist movement and waviness might be effected by laying the blocks in arch form in plan, opposing the direction of the traffic. In the second paper Mr. T. Bowyer Bower dealt with some general points regarding construction and maintenance, and particularly with regard to pit prop or corduroy roads. Last, but not least, there was a paper of great excellence in which Mr. Francis Wood, the borough engineer of Fulham, dealt with the structure of road surfaces. As regards bituminous roads, Mr. Wood reached the conclusion that where bitumen is employed in surfacing a road under heavy traffic no particle of the aggregate should be larger than a quarter of an inch, and that larger material should be used only on roads where the traffic is limited, or confined to those places where temperature varies within small limits. The three papers are to be discussed at a future meeting of the institution, when there should be a large attendance of municipal engineering members.

* * * *

Dealing with Waste Departmentally.

It would be too much to hope that all the lessons in national and private economy which the war has taught us will bear enduring fruit—though there is no earthly reason why they should not; but some, if not a great many, are almost certain to be permanently established if the proper means are taken to see that they are encouraged in public and social affairs. This is a matter of morals as of

habit, and though we are all longing for that free expression of individual action that has to a large extent been necessarily restrained during a long period of stress and anxiety, it is a question whether we should not be wise as a nation to insist upon some measure of compulsory discipline in the maintenance of that economy which takes the form of the avoidance of waste by the salvation of articles that have hitherto been so generally despised, thrown aside or destroyed. In this direction the municipal authorities can do much to help, and the interesting exhibition that is now being held in London under the auspices of the National and War Office Salvage Department, assisted by the National Salvage Council, ought to prove a valuable medium in bringing before the attention of the public many lessons in the art of practical economy and systematic salvage. In London, the Hackney Borough Council has set an example by establishing a department for the salvage of waste materials under the direction of a permanent official, and elsewhere a great deal is being done to this end by agencies of a semi-official character which allot part or the whole of the proceeds to charities. The subject, however, is worthy of being dealt with upon considered, methodical lines, and it would be well if all public authorities took the line of establishing a waste materials department, so as to realise in practice the motto of the National Salvage Council: "There is no rubbish."

* * * *

Meetings. At to-day's meeting of the Institution of Municipal and County Engineers the time will be occupied largely by a series of visits of inspection in the Metropolitan boroughs of Holborn and Marylebone. Two papers are to be presented for discussion, one by Mr. E. F. Spurrell, the borough surveyor, on "Holborn Communal Kitchen and Other Municipal Matters," and the other by Mr. James Gair, the highways engineer to the St. Marylebone Borough Council, in which the organisation of house refuse collection and disposal during the war will be dealt with. The meeting will conclude with a discussion on the education and training of municipal engineers, opened by Mr. A. E. Collins, the chairman of the Institution's Board of Examiners. Another forthcoming meeting to which we desire to draw the attention of our readers is the annual gathering of the Institution of Water Engineers, which will be held on Friday of next week at Burlington House. In addition to the ordinary business of the annual meeting, three papers will be read and discussed. The first, by Mr. Carle Salter, deals with "The Relation of Rainfall to Configuration," while Mr. Samuel Hall treats of "Stream Flow and Percolation of Water," and Mr. Gilbert Christie's subject is "The Freezing of a Reservoir Outlet Works." The programme is a full and attractive one, and it should suffice to secure a large attendance of members and visitors.

CONCRETE ROAD AT SOUTHAMPTON DOCKS.

By F. E. Wentworth-Sheilds, M.Inst.C.E.

A Portland cement concrete road was laid down at Southampton Docks in the summer of 1917. It is 342 ft. long, 25 ft. wide and 6 in. thick, and has no paths or kerbs. It is level longitudinally, but has a transverse camber of 4 in. (about $\frac{5}{16}$ in. per ft.). The greater part is straight, but at one end it has a curve of about 100 yds. radius. It approaches one of the most important quays where vessels up to 20,000 tons are berthed, and consequently has to sustain a fairly heavy traffic of all kinds. The ground in this neighbourhood was reclaimed from the estuary some years ago, the filling consisting of broken chalk several feet in thickness and overlaying the original river mud. The site of the road had, however, been in use for about twenty years, so that the ground was fairly well consolidated. Before the new concrete was laid down the road paving had consisted of water-bound macadam resting on about 1 ft. of hard core, which again rested on the chalk filling. The latter had settled so much that in places it was necessary to raise the road as much as a foot. This was effected by covering the old macadam with ashes, which were consolidated by watering and rolling with a 10-ton roller, the surface being finished off with a camber ready to receive the concrete. The new pavement was made with British standard Portland cement and sea gravel dredged from Langston harbour. It was 6 in. thick in all, the lower 4 in. being mixed in proportion of 1 to 6, and the upper 2 in. in the proportion of 1 to 3. For this upper layer the gravel was all passed through a $\frac{3}{8}$-in. square mesh screen so as to avoid the possibility of the road surface being pitted by the splintering of large pebbles. In the lower layer of the concrete and 2 in. from its under surface was placed one thickness of B.R.C. Fabric. No. 9, the longitudinal wires being $\frac{7}{32}$ in. in diameter and 3 in. apart, and the transverse wires being $\frac{1}{8}$ in. in diameter and 12 in. apart, and electrically welded to the former. This was supplied in rolls 80 yds. long and 7 ft. wide. Four widths were used to extend over the 25 ft. width of the road, thus giving about 12 in. overlap. A similar overlap was given transversely where a roll ended.

While carrying out the work it was fortunately possible to divert traffic on to a temporary road. After rolling the base, the first operation was to lay down the fabric, which was weighted and kept from touching the base of 2-in. pebbles or pieces of brick here and there. On the curved part of the road the fabric was laid parallel to the straight part and sheared off at the sides to suit the curve. Immediately before concreting the base was well wetted. Unfortunately no machine mixer was available, but the concrete was very carefully hand-mixed, being turned three times dry and three times wet before casting into position; the consistency of the concrete was moderately wet. A length of 12 ft. to 15 ft. only was started every day, so as to be certain of finishing the whole thickness before evening. This ensured fine concrete on top being incorporated with the coarser concrete below. Each day's work was finished off against temporary timber templates fastened on pegs at the sides and ends, the surface being formed by working a straight-edge longitudinally backwards and forwards on the end templates. By this means a fairly smooth surface was obtained and no rendering or touching up was necessary. To prevent the possibility of the surface being spoilt by rain at night, it was covered for 24 hours with a tarpaulin sheet, which was supported so that it did not touch the green concrete. After a length had been concreted the next was omitted for a while and the alternate length concreted. Each length was left until it was about a week old, when the intervening lengths were concreted. No attempt was made to form any sort of expansion joint, the concrete being simply shovelled up against the older concrete face. The work occupied five weeks; it was then left for another five weeks—viz., till October 9, 1917—when the traffic was turned on to it. As soon as weather conditions permitted (which was in November, 1917) the whole of the surface was served with a coat of hot tar and dusted over with coarse sand.

The road has stood the traffic so far exceedingly well, and although, of course, a slight crack is visible at the joint of each day's work, there is no sign of deterioration here or elsewhere. The surface is not slippery, and the road has given general satisfaction.

TOWN PLANNING IN QUEENSLAND.

BEGINNING OF A GREAT CAMPAIGN.

In his presidential address to the Australian Town Planning Conference held in Brisbane, Mr. J. D. Fitzgerald, Minister for Local Government and Health, and for Town Planning, New South Wales, said: "We have assembled to plan out the destinies of Australian city dwellers. It is an unchallengeable fact that our movement will change the destiny of the urban populations, that our propaganda will make our civic conditions better, our city plans nobler, our citizens happier and comfortable beyond the dreams of to-day; that our town planners' devices will save millions to the nation which would otherwise be poured out in sheer and wicked economic waste—wicked because preventable.

"We Australians are only at the beginning of the great campaign which we must fight before we create ideal conditions for our city dwellers," continued the New South Wales Minister. "Our Parliaments must hasten to the aid of the pioneers. Already several of the States have general town-planning Bills prepared. Four years of war have changed the face of things as regards housing as well as everything else. Britain has leaped forward 100 years in methods, in organisations, in planning in advance, in housing, and, above all, in outlook.

"If for no other reason the calling of this conference is justified by the fact that the Government of Queensland has made our deliberations cluster round the welfare of the returned soldiers, and has invited us to apply the resources of the town-planner to the problem of making those who have fought for our lives and liberties happier than they could possibly be under the old conditions. We eagerly respond to this invitation, and I hope that out of our deliberations may come practical and helpful schemes that will assist the returned soldier."

Surveyors and Land Acquisition.—At a meeting of the Surveyors' Institution to be held on Monday next, the 9th inst., Mr. J. D. Wallis, of Manchester, will open a discussion on the proposals contained in the first report of the Acquisition of Land Committee, of which Mr. Leslie Scott, K.C., M.P., was chairman. These proposals had for their object the cheapening and simplification of the procedure for acquiring land for public and semi-public purposes. The meeting will commence at 5 p.m. In view of the public interest in the subject, non-members will be admitted on presentation of their visiting cards.

Investigations in the Structure of Road Surfaces.

By FRANCIS WOOD, M.INST.C.E., Borough Engineer and Surveyor, Fulham.*

Prior to the war, the question of the structure of roads was being brought into prominence through the advent of mechanically-propelled vehicles; there can be little doubt, however, that the transport needs of war have brought about a climax and emphasised the imperative and urgent need of providing roads with a structure that will (1) ensure a good and even surface, (2) be suited to the traffic, (3) be reasonable in first cost, and (4) be easily and cheaply maintained.

Considerable expenditure has been incurred in the past in providing elaborate foundations, which were in many cases necessary owing to the indifferent character of the surface, but there are many cases in which the strength and cost of this section of the road structures are such as would not have been necessary if the surface had been kept even and regular.

The author suggests that, provided a homogeneous mass of material is interposed between a stable substructure and the wearing surface (also homogeneous), the foundations need not be, in effect, more than 4 in. in depth, and such a combination will satisfy all traffic which reasonably conforms to the regulations that apply to vehicles in this country. It is common knowledge that no failure of the foundation of newly-laid wood pavements is noticeable until the surface begins to develop hollows through wear; it is then that the foundation of concrete begins to show defects.

An apparatus was designed and attached to the rear part of a motor car which would trace on a moving piece of paper the action of the wheel and the body of the vehicle as it passed a hollow in the pavement 18 in. long and $1\frac{3}{8}$ in. deep at a speed of 5 to 7 miles per hour. From the resulting diagram various deductions are made, but the most important is that the vehicle was actually stopped in its progress, thus indicating that the momentum acquired by the load on the wheel had been expended on the side of the hollow. It is evident that a continued series of similar blows would cause a very severe strain to the strongest foundation, and would be proportionately greater from commercial vehicles.

The test over an obstruction of the same height did not stop the progress of the vehicle.

The test emphasises the importance of "stitch in time" repairs, and also the provision of a wearing surface that will resist the wear to the greatest extent, so that hollows do not quickly develop through wear.

Probably the bituminous type of pavement satisfies this demand better than any other that is known at the present time.

TWO-COAT WORK.

The paper deals with the two-coat mechanically mixed or artificial asphalt type, as the cost of this construction is less than of natural asphalt. For average traffic it consists of a wearing surface about 1 in. to $1\frac{1}{4}$ in. deep laid on a 3-in. to 4-in. bituminous base coat.

Experiments proved that the base coat itself could be made to act not only as a base, but also to give the wearing surface, and would wear more economically than water-bound macadam. Disintegration began in the third year; the coat subsequently recovered, but disintegration again developed later, and eventually it failed under heavy traffic after about six years. The causes are investigated, and the failure is attributed to the expansion and contraction of the bitumen in combination with the use of large-sized stones.

The conclusion arrived at is that the surfacing material, which is exposed to considerable variations of temperature, should not have any particles larger than about $\frac{1}{4}$ inch when used with bitumen.

This points to a justification of the separate wearing surface coat laid on a base which can be made with a composition of large, medium and small-sized stone mixed with a suitably prepared tar.

In regard to the wearing surface coat many different compositions have been laid, and there has been a noticeable proportion of comparative failures. There has been a tendency to attribute these wholly to the bitumen used in the composition. In the author's view, although the bitumen plays a very important part, it is almost of minor importance compared with the grading of the mineral matter and the distribution of the bitumen.

Calculations are given which consistently indicate that the thickness of the film of bitumen on the surface of the particles of natural and artificial asphalt is such that Nature employs 50 per cent less than is used in the synthetic asphalt. A table is given indicating the amount of bitumen required to cover any particular grade of material. From this table the percentage of bitumen required to coat any specified mixture of grades of material can be readily determined. The table will be advantageous in helping to ascertain whether the cause of the failure may be attributed to the lack of bitumen.

In the above comparison of natural and artificial asphalt, the percentage of bitumen by weight of analysis is very similar to that of the artificial material. There would be a different result if volumetric analysis had been made. An example is given of two analyses of the same grading of bitumen contents, yet when the specific gravities had been determined, one shows 25 per cent bitumen less than the other. Hence misleading conclusions may be arrived at unless the whole of the factors are taken into consideration.

VOIDLESS COMPOSITION.

In connection with the design of the structure, it must not be assumed that any grading of material can be used, or similarly that the grading should be so arranged as to give a voidless structure. A voidless structure *per se* will not necessarily give a good road structure; in fact, a designed voidless structure will give a percentage of voids when in the road, because it is laid when the bitumen is in an expanded state, and as soon as it is cold it contracts and must leave voids. A rolled and tamped surface coating will show about 15 per cent to 20 per cent voids on the underside of the coat, while at the surface it is free from voids.

Examples are given of aggregates of various sizes to bring about a near approximation to a voidless composition; the amount of bitumen that would be necessary to fill the void is calculated, and it is shown that it would not properly coat the surfaces.

Pavements that have proved satisfactory show that the fine particles must predominate. It is probably the case that the bitumen containing what are technically termed colloids—*i.e.*, impalpable material of such fineness that if mixed with water it will not settle out after twenty minutes' quiescence—will be more successful than the bitumen that contains no colloids or their equivalent. Apart from this, the opinion is expressed that in the bituminous wearing surface coat about 40 per cent of the aggregate should be of 200, 100 and 80 mesh (the larger proportion being 200 mesh), 40 per cent of 50, 40 and 30 mesh, and 20 per cent of 10 to $\frac{1}{4}$ in., and that the film thickness on the surface of the particles should be at least 0·00065 to 0·00070 in.

The author further indicates that there is no advantage in any particular material that is used as the aggregate, that almost any that is locally obtainable, provided it is in a free state and of suitable grading, may give equal results—*e.g.*, clinker from a refuse destructor ground to the necessary sizes, grit swept from macadam roads, wood-fibre, &c.

* Abstract of paper read at a meeting of the Institution of Civil Engineers on Tuesday last.

WOMAN AS HIGHWAY SUPERINTENDENT.

"A REAL GENERAL MANAGER."

Many occupations that before the war were considered suitable only for men have been taken over by women. But County Engineer David White, of Tacoma, Washington (says the Toronto *Contract Record*), believes that Pierce County is the first to have a young woman superintendent for a concrete highway contract. The Pacific Highway from Tacoma to Camp Lewis is the job, and Miss Verona M. Morgan, the nineteen-year-old daughter of Contractor T. M. Morgan, of Everett, Washington, is the young woman. Miss Morgan acted as superintendent last year on Snohomish County Bond Issue Road No. 28, leading from Monroe to the King county line—a job six miles in length. She has handled this work most efficiently, and this is one of the first jobs at the low prices prevailing then upon which a profit was made.

Miss Morgan is supervising all details of "hiring and firing" the labour, keeps the books, and is a real general manager. In addition to these duties, when the camp cook recently exercised the cook's prerogative and quit without notice, the young lady kept the job going by doing the cooking for forty men for three days until a new chef could be secured. Mr. Morgan has several concrete highway contracts under way this season, and wishes that he had more daughters.

Town Planning in Lanarkshire.—The Local Government Board have granted the application of the District Committee of the Middle Ward of Lanarkshire for authority to prepare town-planning schemes for areas at Cambuslang, Newton, Carmyle, &c.

RAND WATER SUPPLY.

REINFORCED CONCRETE MAINS IN EXTENSION SCHEME.

In his report covering the twelve months ended March last, Mr. W. Ingham, M.INST.C.E., M.I.MECH.E., chief engineer to the Rand Water Board, furnishes some particulars of a scheme by which it is proposed to improve the water supply to the East Rand.

The scheme provides for laying a 24-in. pipe line, nearly 7 miles in length, from the Village Pumping Station, Johannesburg, to a new open reservoir, having a capacity of 2½ million gallons, which will be erected on Signal Hill, about 1 mile north of the present Simmer and Jack reservoir, Germiston, at an elevation of 5,822 ft. above sea level. From this reservoir an 18-in. pipe, about 1 mile in length, will be laid to connect, near the Simmer and Jack reservoir, with the present 16-in. trunk main leading to the East Rand.

It is also proposed to erect a new open reservoir having a capacity of 2½ million gallons on the hill about 2½ miles north of Benoni, at an elevation of 5,580 ft. above sea level. A new main, 12 in. in diameter and nearly 3 miles in length, will be laid between Benoni and the latter reservoir, and will act as an outlet as well as an inlet pipe. Automatic valves will be fixed in the pipe line in the neighbourhood of both reservoirs, so that the water will pass direct into the distributory mains when the reservoirs are full. The area served by the Benoni Reservoir will cover the whole of the East Rand. This reservoir will stand about 160 ft. above the floor level of the Benoni Town Hall. The water pumped into the Signal Hill Reservoir will gravitate to the Benoni reservoi, or, if that reservoir is full, will supply the East Rand direct through the present trunk mains.

The present trunk main between the Simmer and Jack reservoir and the Benoni township, which consists of 16-in. and 14-in. pipes, will be utilised for delivering the water to the East Rand, but eventually it will be necessary to lay a second main on this section.

Owing to the difficulty of obtaining steel and cast-iron pipes for this scheme, it has been necessary to consider an offer from the Hume Pipe Company for supplying reinforced concrete pipes. Before the board decided to accept this offer, enquiries were made from well-known engineers in Australia and Tasmania as to the desirability of utilising the Hume pipe to withstand a working head of about 300 ft., and the replies were entirely satisfactory.

The total cost of the scheme will be £75,315, of which about £47,000 will be for reinforced concrete pipes.

PUMPING COSTS.

The total cost per 1,000 gallons based on the quantity of water sold by the Rand Water Board during the year was 7·6404d., as compared with 7·4189d. during the previous year; while the cost for pumping and maintenance only on the same basis was 4·6811d., as against 4·1572d. for the previous year. These increased costs are largely due to the higher cost of stores and wages, and to the smaller quantity of water pumped.

The cost of water per 1,000 gallons raised 100 ft. during the year was 0·2462d., as compared with 0·2555d. for the previous year. This shows a decrease of 0·0093d. per 1,000 gallons, which is due to the fact that the average head was greater than in the preceding twelve months.

SUPERANNUATION.

A CONTRIBUTORY OR NON-CONTRIBUTORY SCHEME?

The question of superannuation was considered by the Executive of the County Councils Association at its last meeting, and it was decided:—

"That it is even more desirable than ever that a national scheme of superannuation for all salaried local government officers, to which the State should contribute, should be established as soon as possible, but that, in view of many circumstances which have occurred since the association considered the subject seven years ago, including the immensely increased amount of work, both local and national, carried out by county councils and their officials, and the introduction of the School Teachers' (Superannuation) Bill, the question whether the scheme should be contributory or non-contributory should be left open for further consideration."

Thurrock, Grays and Tilbury Sewerage Scheme.—The Thurrock, Grays and Tilbury Joint Sewerage Board have decided to apply to the Local Government Board with a view to the removal of the embargo on the loan for the joint sewerage scheme which was virtually sanctioned, but stopped owing to the war.

LAW NOTES AND QUERIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

Ancient Lights: Light to a Doorway.—A novel and important point as to the acquisition of an easement of light was decided in *Levet* v. *Gas Light and Coke Company* (Chancery Division, Mr. Justice Peterson, October 29th). The plaintiff was the lessee and occupier of a workshop and premises adjoining a 5½-ft. passageway between Horseferry-road and Great Peter-street, Westminster, where he had carried on the business of a wood-turner for twenty years, and he claimed a prescriptive right of light to the premises. The company owned a house on the opposite side of the passage, and in 1917 they acquired a house on the plaintiff's side, and proceeded to erect a bridge connecting the two houses. The learned judge inspected the plaintiff's premises and came to the conclusion that there was no material interference with the light to the windows on the ground and first floors, but that the light coming to a third small aperture on the ground floor was substantially diminished, and that the bridge materially diminished the light formerly coming through two doorways when open. It was contended, on behalf of the company, that there was no right to an excess of light through an aperture such as a door, which was primarily intended to exclude light. Mr. Justice Peterson decided in favour of the company on this point. In the course of his judgment he said the question remained whether the plaintiff had any right to complain that the excess of light through the two doorways had been obstructed, or, in other words, whether an owner of a house who opens an ordinary door whenever he pleases and by this means lights the space behind the door can claim a prescriptive right to light through the doorway. Here the upper door was opened, when the weather was favourable, to obtain additional light for a bench, while the lower one was opened for ingress and egress, and also frequently kept open in suitable weather to admit light to the shop and let dust out. His lordship was of opinion that Sec. 3 of the Prescription Act, 1832, applied to windows or apertures in the nature of windows, and not to apertures with doors in them, which were primarily constructed for the purpose of being closed. No one before this case appeared to have suggested that if an ordinary door is left open from time to time as and when the owner thinks fit during twenty years, the doorway becomes an ancient light. The result would be surprising. He was of opinion that the plaintiff's contention was erroneous, and that he had not acquired any right to the access of light through the two doorways in question. The only good ground of complaint, therefore, was in connection with the obstruction to the small window on the ground floor, and as to that he assessed the sum of £15 as adequate to satisfy the injury sustained.

Building By-Laws: Addition to Building.—"T. J. R." writes: It is proposed to take off the roof of an existing two-storey building, raise the walls and replace the roof, so adding an additional storey. The walls of the existing building are 9 in. thick. The by-laws require that if an addition is made the walls below the topmost storey shall be 14 in. thick, but the owner of the building claims that under Sec. 23 of the Public Health Acts Amendment Act, 1907, clause (*d*), it is not necessary for him to alter the existing walls although the additional storey may overload the existing walls and so make the building dangerous. I shall be glad of your opinion as to whether his contention is correct. Sketch herewith.

In my opinion the owner's contention is *not* correct. The effect of sec. 23, clause (*d*) of the Public Health Acts, 1907, is that the making of the addition is to be deemed to be the erection of a new building, so far as regards the addition only: so that the by-laws relating to new buildings will apply thereto. But the by-laws as to the thickness of the walls below the addition will, in my opinion, remain in force, nevertheless, and must be complied with accordingly.

Burial Ground.—"H. M." writes: What is the minimum distance from a highway, reparable by the inhabitants, that graves in a burial ground may be made. Can the minimum distance—say, the building line—be fixed?

There does not appear to be any statutory provision prohibiting burials within any distance from a highway. But under Sec. 9 of the Burial Act, 1855 (as amended by Sec. 1 of the Burial Act, 1906) no burial ground not in use at the date of the earlier Act can be used for burials within 100 yards from a dwelling house previously erected, without the consent of the owner, lessee and occupier of the house. And in the Memorandum of the Local Government Board of July, 1908, on the sanitary requirements of burial grounds it is suggested that it is desirable that interments should not be made up to the extreme edge of a burial ground, and that it would be possible, without great waste of space, to reserve a strip of ground free from interments, say 15 ft. in width, around the whole burial ground, on the interior of the boundary fence.

The Editor will be glad to receive copies of annual and other reports dealing with matters of interest to "Surveyor" readers.

PUBLIC SERVICE MOTOR VEHICLES.

QUESTIONS OF DESIGN.

Having thus far touched upon some of the advantages of self-propelled vehicles over those drawn by horses, we will now deal with a few of the more important points to be considered in the selection of the vehicles.

In the carrying out of the various services of a local authority, the work in which such vehicles are engaged is of necessity of a rough and "knock-about" character, especially in connection with scavenging and in the general haulage of materials. Consequently vehicles should be of considerable strength in design and material without being unduly heavy. This applies generally to the engines and gears, which should be simple and, if possible, fool-proof, as they are liable to be handled and driven by men of little experience, and—as a rule—not very "soft handed." The ordinary slop cart or wagon, and even the house refuse collecting vehicle should be low on its axles to facilitate loading, and the arrangements for tipping should be carefully examined, much depending on the manner in which this is effected as to whether the contents are easily got rid of. Another point to be borne in mind is whether the action of tipping is likely to cause any injury to the vehicle after considerable use, though in this connection it will be found that most motor-driven tip wagons are fitted with simple means for quick tipping. A further point to be considered is that of the effect which the vehicle is likely to have on the surface of the roads. The local authority should set a good example in this respect. Consequently the wheels should not be of small diameter; rubber should take the place of iron or steel tyres, and if rubber cannot be introduced, then the tyres should be of sufficient width. The question of the space taken by the vehicle to turn in should not be lost sight of, nor that of the facilities for backing the vehicle easily.

Speed, as a rule, is not of such importance as power, and the changes of speed should naturally give sufficient power to carry the vehicle, when fully loaded, up the steepest gradient likely to be encountered. The brake power should not be forgotten if accidents are to be guarded against, and should be so arranged as to be capable of being quickly and evenly applied without it being necessary for the driver to take his attention off the steering wheel. All the machinery should be readily accessible for lubrication and repairs, and the amount of fuel required per mile run should be ascertained by trial, while the cubic capacity of the vehicle must also be taken into account in order to arrive at the ultimate ton-mile result. In street watering, or street washing, this question of capacity is of great importance, as the amount of water which a vehicle can contain makes a considerable difference in the working results. For instance, the length of time taken to fill a water van depends on the size of the standpost and the swan-neck or hose, and the pressure in the main; the position of the standposts is also important, and waiting should be reduced to a minimum. The width of spread and the time taken in spreading are, of course, also very important factors. All these points require attention in considering the substitution of motor water vans for horse-drawn vans. A careful comparison of time tables should be made, although it is hardly necessary to point out that it is an obvious advantage if a motor water van holding double the quantity of water of a horse-drawn van can spread the water in, say, half the time occupied by the horse-drawn vehicle.

With regard to the self-filling street-sweeping machines, the weight of these and the power required to operate them should be ascertained, and a matter that should not be overlooked is whether the material lifted from the street surface is equally distributed in the wagon or dumped at one end only, requiring constant shifting by hand labour. There are doubtless a great many other points which require careful consideration, and the suggestions we have put forward may be helpful in indicating the directions in which investigations should be made.

DOVER REFUSE COLLECTION COSTS.

Electric vehicles have been in use in Dover since August, 1915, for the purpose of collecting house refuse.

Six vehicles were purchased, being constructed to carry 2 tons of refuse. They are of 6 h.p. each, and have a speed of 12 miles per hour. The vehicles are charged at night from the Corporation Power Station, and are capable of running 20 miles on a single charge on the flat; tipping is motor controlled. Each vehicle covers an average of 15 miles per day, the crew consisting of one driver, two tippers and one boy. Mr. W. C. Hawke, Assoc.M.Inst.C.E., the borough engineer and surveyor and water engineer, considers it advisable to dock the vehicles once in six months for general examination and overhaul. The expenditure for the financial year ended March last for current, repairs and maintenance, insurances and wages amounted to £2,103 7s. 5d., and against this, says Mr. Hawke, there should be credited the sum of £60 6s. received for removing ashes from the docks, &c.; 10,345 tons of refuse were collected and conveyed to the tip at a cost of 3s. 11·4d. per ton. Allowing a life of ten years, the capital charge to be added to this amount is 1s. 6d., making a total cost of 5s. 5·4d. per ton handled.

To have handled the same amount by horse transport would have cost, at the present price of horse hire, 8s. 0·5d. per ton, thus showing a saving of 30 per cent.

THE WESTON-SUPER-MARE EXTRAORDINARY TRAFFIC CASE.

A report states that the recent action in regard to "extraordinary traffic" brought by the Weston-super-Mare Urban District Council against Henry Butt and Company, Limited, was again mentioned in the Chancery Division recently, before Mr. Justice Eve. According to a statement by Mr. Maughan, K.C., for the defence, it appears that there was some uncertainty as to the apportionment of costs between the parties. He pointed out that there were two claims in the action, one for "extraordinary traffic" and the other for nuisance. Plaintiffs failed upon the latter claim, and therefore they were not entitled to costs in respect of that part of the case. Mr. Macmorran, K.C., for the plaintiffs, said the minutes of the order were drawn up exactly in conformity with the judgment. Mr. Justice Eve said that there was a slip on his part, as he intended to exclude the costs in respect of the nuisance. The plaintiffs were entitled to general costs of the action, except so far as they were increased by the issue as to nuisance, upon which the plaintiffs failed.

PETROL AND PARAFFIN PRICES.

The prices of petrol and paraffin have been reduced by 2d. per gallon as from last Monday, the reduction following the reception by the Director of the Petroleum Executive and the Chairman of the Petroleum Supplies Pool Board of two deputations from the Standing Joint Committee of Mechanical Road Transport Associations.

Acton Urban District Council are contemplating the purchase of motor vehicles in the near future.

Great Harwood Urban District Committee have asked a committee to consider the purchase of a motor wagon for refuse collection.

CORRESPONDENCE.

(One man does not see everything.)
—Euripides.

DANGEROUS TREES.

To the Editor of The Surveyor.

Sir,—There is an old saying that "it's a wise son who knows his own father." But I doubt if he is a wise surveyor who says a tree is safe.

In a recent gale a large beech, apparently in the best of health, fell here. The live roots supporting it spread towards the only open ground next the trunk; the remainder of the roots were decayed, as the tree was nearly surrounded by laurels.—Yours, &c.,

C. H. Cooper.

Cooper's Hill,
Queens' County.

CONCRETE IN HOUSE BUILDING.

To the Editor of The Surveyor.

Sir,—Do any of your readers know of any workmen's dwellings in which concrete or other suitable materials have been used in the place of timber joists and floorboards for both ground and first floors? If so, I should be pleased to hear what the construction is, where it is to be seen, and whether it meets with the approval of the occupiers, and of the Local Government Board.

As regards the parlour, living-room, &c., the site concrete could be kept up at such a level as to form the ground floor, while the bedroom floors might be constructed of hollow tubes or coke-breeze concrete, which would be lighter in weight and warmer than gravel concrete; and both floors could be finished off with a rendering of some material such as cement and fine sawdust, cork dust, pulverised leather or rubber composition—coloured to give a warm appearance—which would not be so cold to touch as cement and sand. This rendering could be taken up the walls to form the skirting with a cove formed at the junction of floor and walls.—Yours, &c.,

W. D.

November 28, 1918.

Publishers' Note.—Notwithstanding the manufacturing difficulties Messrs. Black confidently expect to publish "Who's Who, 1919," and "The Writers' and Artists' Year Book, 1919," as usual this week.

C*

Road Corrugation.

By ERNEST LEONARD LEEMING, M.SC.TECH., ASSOC.M.INST.C.E.*

The introduction of mechanically-propelled vehicles on highways has produced a troublesome and perplexing feature of road wear—namely, corrugation—which, owing to the existing war conditions, when the main roads of this country are heavily trafficked and their maintenance much neglected, has become serious.

The object of this paper is to state the present position of the problem with regard to road construction and vehicle design, and to indicate probable causes of the trouble, with some suggestions for preventing or alleviating it.

The phenomenon of wave formation or corrugation is met with in most cases of rolling motion on a plane surface. As a general rule, the formation of waves on a road surface is accompanied by longitudinal movement of the road material in the direction of the traffic, and this movement usually depends on the tractive resistance of the particular material; consequently, water-bound macadam is more likely to become wavy than tar macadam, and so on.

Horse traffic alone may cause waves to develop, but the damage to a road in this respect is only slight compared with that done by motor traffic. The action of the driving-wheels of motor traffic is similar to the pulling action of horses' hoofs, and causes the upper layers of the road-material to be moved backwards—*i.e.*, in the opposite direction to the traffic; setts, for instance, are tilted backwards. And therefore the combined effect of forward movement as a whole and tilting or backward movement of the surface is to produce ridges and hollows.

The effect of a wheel passing over the hollows of a corrugated surface, or over potholes, is to produce a blow on the opposite side of the hollow, and this is shown to depend upon $\frac{W v^2 l^2}{r^2}$ where W, v, l and r are unsprung weight, speed, width of hollow, and radius of wheel.

It is generally admitted that the road roller will form initial waves unless great care is exercised, and that traffic will quickly accentuate them. The Crompton three-axle roller introduces a principle which is of great importance in considering the road wave problem.

The action of a two-axle motor vehicle may be studied by observing the effect when the front wheels meet with an increased resistance due to a ridge or a pothole. The lead of the body of the vehicle on the front axle is increased and the lead of the back axle on the body is likewise increased, owing to the greater resistance to the driving effort; in other words, vibration of the vehicle as a whole is set up by the distance between the front and back axles changing with a definite period, according to the type and suspension of the vehicle. The wheel-base appears to have some definite relation to the period of the waves formed, and a long wheel-base assists the springing of the vehicle, and enables it to hold the road at speed when the surface is rough or wavy.

Considerable improvements in the suspension of the heavier motor vehicles are needed, the present practice only allowing of the absorption of shocks vertically, and not in the direction of the reaction of the blow on the road; in this respect, auxiliary springs, check springs, and shock-absorbers are very useful.

The effect of the differential gear in continuing waves along and across a road cannot be too strongly urged, and it is this feature of motor omnibuses which probably accounts for the rapidity with which they propagate waves. If one wheel leaves the road surface, racing takes place, and impulsive driving in both wheels is set up; when the wheel returns to the surface of the road it produces a strong grinding effect on the material. The same action takes place when braking the rear wheels, except that the grinding action is in the direction of motion of the vehicle.

An interesting feature of road corrugation is that it often commences earlier on down gradients and at bends than on straight level lengths of road. In the case of the down gradient, the reasons for rapid wave-development may be stated as follows:—

(*a*) It induces increased speed and vibration.
(*b*) It increases the unsprung weight.
(*c*) Driving action and braking action are greater than on level roads.
(*d*) The road material is subjected to very great pushing stresses in a downhill direction.

The increased wear at bends is due mainly to the action of centrifugal force bringing greater weight on the outer wheels, and to the differential gear assisting racing and grinding action. The camber of a road also has some influence on wave formation.

The pitch of the waves is not easily determined from vehicle dimensions, since it often varies at different points on the same road under similar conditions of traffic. The occurrence of rudimentary waves, together with fully developed waves, is another interesting feature of road corrugation. Generally, the pitch is less when the speed is greater; it is also quite independent of the kind of road material laid down.

With regard to the different classes of roads laid at the present time, sett-paved roads are only capable of offering resistance to wave-formation when laid on a concrete foundation. Where setts are laid on a yielding and inelastic foundation, corrugation will be quickly set up and considerable tilting and lateral movement will result from heavy traffic. Moreover, Durax paving and wood blocks do not seem able to resist the destructive forces of modern traffic, and sooner or later waves develop.

It is suggested in this paper that, wherever possible, setts or blocks should be laid arch-shape in plan, to oppose the movement caused by traffic in a particular direction, so that the paving may be rendered unyielding both vertically and horizontally.

In the case of macadam and tar-macadam roads the former is quite useless where heavy traffic is concerned, and even tar-macadam offers no real solution to the problem.

The bituminous road-surface appears to be the most suitable for modern traffic, on account of its great strength and also its elastic qualities, which go far to compensate for the unsprung weight of vehicles. Further, traction and vibration are reduced to a minimum. The development of waves on a bituminous surface is analogous to the formation of waves in the rolling of hot armour plate.

It is possible that concrete as a surface, under good conditions, might prove a suitable material, but it has not been sufficiently tried in this country to enable definite conclusions of its wave-resisting qualities to be formed.

The conclusions of the paper show that unless two-axle vehicles can be provided with reasonably good springing, such as results from the air-cushion of the pneumatic tyre, some development in the direction of providing three axles, and increasing the number of driving-wheels accordingly, for heavy vehicles is necessary to alleviate the trouble of road-waves.

* Abstract of paper read at a meeting of the Institution of Civil Engineers on Tuesday last.

"Coals to Newcastle."—At the last meeting of Atherstone Rural District Council, the surveyor, Mr. H. J. Coleby, reported that 75 tons of road stone had been allocated to the Atherstone district, with instructions that it must be obtained from Enderby. This kind of stone, he believed, could be had from the local quarries and carted straight on to the roads. It would be an unnecessary use of railway wagons and transport generally to obtain it from Enderby. A councillor stated that there was plenty of stone at the local quarries, and if they could not fetch this away for their own roads, then the highways must remain unrepaired. The surveyor was authorised to represent to the County Committee that the council considered it unnecessary to despatch stone from Enderby to Atherstone.

Road Maintenance Difficulties in County Wexford.—The county surveyor, Mr. P. Hanrahan, reports that there is a general shortage of road material in Wexford, owing to difficulties arising out of the war. In the Wexford rural district two important quarries have been almost completely closed up, and the roads which they supplied are without materials for repair or upkeep. The difficulty about explosives for quarrying prevented contractors generally obtaining their own materials as hitherto. In addition to that, the War Office had commandeered the county council engine, and the breaking of stones for road maintenance has been brought to a standstill. A number of roads are untendered for, and the county surveyor is employing direct labour to try and keep them in repair. Two roads in the county in the rural district of New Ross incurred extraordinary expense, and the county surveyor estimates that it would require a sum of £500 to restore them. In addition to deterioration for want of road material for maintenance, the roads are suffering from exceptional war-time traffic. Motor lorries, transport, and haulage of timber in excess of the ordinary traffic conditions are in Wexford, as elsewhere, causing considerable damage.

Pontypridd Tramways Extension.—An extension of the Pontypridd tramways has been decided upon, the matter being referred to the surveyor, Mr. W. E. Lowe, and the electrical engineer for report.

LOCAL AUTHORITIES AND HOUSING.

STATE AND PUBLIC UTILITY SOCIETIES.

In March the Government announced the terms they were prepared to offer to local authorities who undertake house building. They stated that, in the exceptional conditions likely to exist, they must look to the local authorities for the bulk of the houses, but the encouragement of private enterprise was not overlooked, and the Minister of Reconstruction (Dr. Addison) appointed a committee to consider how far this could be done. This committee, the Housing (Financial Assistance) Committee, in an interim report dealing with the public utility societies, recommend that loans of 80 per cent of the value of any housing scheme carried out by such a society should be made by the State at the lowest rate at which it can lend without loss. Repayment may be spread over fifty years and advances made during building. They are unanimously agreed, however, that loans alone will not produce any substantial number of houses and that subsidies will be essential.

The majority of the committee expressed the strong opinion that the State should bear the whole of the loss incurred by a society in building at once, but they feel precluded from recommending that the State should bear more of the loss in the case of public utility societies than in that of local authorities, and they therefore recommend that the State should bear 75 per cent of the loss and that the local authorities should be empowered to subscribe to the remainder. The minority dissent from the opinion that the whole loss should be borne by the State, and recommend that the same terms as those offered to local authorities should be applied as nearly as possible to public utility societies. Both majority and minority recommend that such assistance should be given only under stringent safeguards. They also recommend that in view of changed conditions the maximum rate of dividend payable by such societies should be increased from 5 per cent to 6 per cent.

RURAL "HOUSING."

In the course of a discussion on housing at the meeting of the Erpingham Rural District Council lately, references were made to premises in the district condemned before the war as unfit for human habitation, but still being occupied. The Rev. A. B. Stevenson referred to a case of five hovels at Trunch as coming under this category, and said their relieving officer had that morning told a terrible tale of removing from one of these a woman and several children, who were found there helpless, suffering from pneumonia, some of them almost dying, the condition of the premises being shockingly unfit. Though condemned years ago, they were sold by public auction comparatively recently, the entire five only realising £17 10s., and they were still being used for human occupation. The sanitary inspector confirmed these statements, except that no closing order for these and other cottages instanced had been made by the council. Public health officials had condemned them. The council decided to issue a closing order for the five Trunch cottages.

NATIONAL KITCHENS IN NEW HOUSING SCHEMES.

Alerman Spencer, Director of National Kitchens, speaking at the Royal Institute of Public Health, said the new housing schemes should include plans for national kitchens. The strongest prejudice against these kitchens had been found among the working classes, who were the most conservative people in the country. The kitchens that had failed had been the distributing kitchens. Unquestionably restaurant kitchens were what was wanted. They must be run and advertised on business lines, and the amateur element must be eliminated. He trusted that when the town halls, libraries, and public baths now in use as kitchens reverted to their normal capacities suitable buildings for kitchens would be available in the main streets of all towns.

THE COST OF LAND.

At a meeting recently of the Durham Rural District Council, consideration was given to the recommendation of a committee that, in view of demobilisation, the housing scheme should be expedited as much as possible. Mr. Lund said a scheme for 198 houses had been laid aside because the owner of the land selected required so high a price. Unless compulsory powers were obtained, the scheme would lie dormant year after year and probably many thousands would be turned out on to the road. The clerk (Mr. J. Chambers) said they had no compulsory powers, and could not get any without getting a provisional order and going to arbitration. The Local Government Board's was a most complicated scheme. It was absolutely useless going on with a housing scheme unless they could purchase land at a reasonable price, and at present there were no means to compel an owner to sell land at a reasonable price. In answer to a question, the surveyor (Mr. G. Gregson) said the council offered £250 an acre if the owners would give land for the streets.

Chester Rural District Council have agreed to a scheme for the erection of 150 cottages.

The Housing Sub-Committee of the Worksop Urban District Council recommend the council to provide 200 houses.

Birmingham Housing and Town-planning Committee recommend the purchase approximately of 515 acres of land at Quinton for housing purposes.

Honiton Rural District Council are making application to the Local Government Board for sanction to a loan of £3,000 to purchase sites for the erection of working-class houses.

In connection with the post-war housing proposals the West Sussex County Council have directed the county surveyor, Mr. H. W. Bowen, to submit a scheme for housing the council's roadmen.

Erpingham Rural District Council have resolved to inform the Local Government Board of their willingness to build houses, but urge that the financial proposals of the board are inadequate.

Tredegar Urban District Council propose to build 500 houses, and Mr. A. F. Webb, architect for the council's housing scheme, has prepared a sketch plan of the houses ready for the inspection of members.

The Mayor of Dartmouth has announced his intention of presenting to the town as a war memorial four five-roomed houses for wounded soldiers and sailors, and Mr. F. I. Voisey, borough surveyor, will prepare the plans.

At a housing conference at Truro recently of representatives of Cornish local authorities, it was decided to ask the Government to give a definite guarantee that the charge for housing on local authorities would not exceed a 1d. rate.

Yiewsley Urban District Council are making application to the War Office for the release of the council's surveyor, Mr John Lewis, in order that the work of preparation in connection with the housing scheme may be proceeded with.

The Bredbury and Romiley Urban District Council, Cheshire, have purchased 28 acres of land for a housing scheme. The surveyor, Mr. Albert Plunkett, has been instructed to at once proceed with the preparation of a scheme for the erection of 280 houses.

Sunderland Town Council have passed a resolution expressing the opinion that the Government contribution of 75 per cent towards the annual deficit on housing should be continued till the sinking fund had brought about the redemption of 50 per cent of the original loan.

Huddersfield Town Council have 130 to 150 acres of good building land in various parts of the borough for the erection of houses, and it was reported recently that when the war ended and material and labour were available it would be an easy matter to obtain sites for from 2,000 to 3,000 houses.

East Grinstead Rural District Council have instructed the surveyor, Mr. C. Turton, to prepare a plan showing suitable sites in several parishes for the erection of twenty-eight cottages for the council's employees with the view of making the necessary application for the purchase of the land required.

The sanitary surveyor of the St. Asaph Rural District Council, Mr. E. O. Evans, and the medical officer of health have prepared a report showing that the minimum requirements of the district are at least seventy more houses, and they fear that for every new one erected an existing house will have to be pulled down owing to their insanitary condition.

Rushden Urban District Council have agreed to a scheme for the erection of 100 houses, and Mr. W. B. Madin, the surveyor, has been instructed to lay out the estate with a view to saving as much roadmaking as possible. The council are making application for the release from the Army of Mr. Lloyd to assist the surveyor, and have engaged Messrs. Brown and Fisher as architects.

The East Sussex County Council have adopted the principle of providing housing accommodation for sectional roadmen at or near the junctions of sections upon which they are engaged, and have asked the Roads and Bridges Committee to consider the details of a scheme, and that the return prepared by the county surveyor be submitted to the County Housing Committee for their consideration.

Sir William Dunn, speaking on "Housing Schemes" at the Royal Institute of British Architects, said the practical work called for the exercise of all the knowledge, skill and experience that could be acquired on the engineering side in the surveying, levelling and laying out of streets and sewers, on the organising side in managing the works and interests concerned, in planning cottages, and planning them cheaply, and of architecture in producing a pleasing result, in the face of difficulties of all kinds.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Boston R.D.C.—The council have accepted the tender of Mr. J. W. Pinder, Boston, at £650, for the erection of the new bridge over the Maryland drain in Amber Hill.

Cannock U.D.C.—A scheme has been approved for the provision of public baths in the Chadsmoor district.

Exeter T.C.—The city council are considering a proposal for the erection of a large new public library.

Greenwich B.C.—It has been agreed to dismantle the disinfecting apparatus at the Bonning-street depot, and to provide a building for disinfecting purposes in Tunnel-avenue, at an estimated cost of £500.

Hants C.C.—The Public Health and Housing Committee have been authorised to purchase Northerwood House and Park for the purpose of a hospital for incurable cases of tuberculosis for a sum not exceeding £15,000, towards which the Local Government Board will make a grant of £9,600.

Morecambe T.C.—The town council have decided to obtain competitive designs for a new town hall, to be erected on the Poulton Hall estate.

Sidmouth U.D.C.—The council have resolved to suggest to the county council that the time is now opportune for re-opening the question of providing an isolation hospital for East Devon.

ROADS AND MATERIALS.

Battersea B.C.—The borough council have accepted the offer of Messrs. I. B. Lee and Sons, to purchase 100,000 second-hand wood blocks at £12 10s. per 1,000 cleaned, and £11 10s. per 1,000 uncleaned.

Braintree R.D.C.—The surveyor, Mr. C. V. Bright, has prepared plans and estimates for a proposed new road to take the place of a submerged road leading from Witham to Braxted. The council have meanwhile deferred the consideration of the matter to ascertain whether subscriptions in aid of the scheme will be forthcoming from persons in the area.

Brighton T.C.—The town council have agreed to purchase property in Church-street at a cost of £230 for the purpose of a street improvement.

Bristol T.C.—The city council on Tuesday last approved a recommendation of the Housing and Town Planning Committee that the work of constructing the low-level road to Avonmouth should be taken in hand at the earliest possible moment, and especially that section between Sea Mills and Avonmouth.

Cottingham U.D.C.—It is stated that the Government authorities had accepted responsibility for road damage caused by timber traffic, and had asked for particulars, which the council have promised to supply.

Dundee T.C.—It was reported that preparations have been made for proceeding with the street and housing schemes as soon as a start can be made with the works. Everything is in readiness to absorb labour for the roads, the city engineer, Mr. J. Thomson, having estimated for 8·70 miles of fire-clay pipes and 6·37 miles of road.

Eastbourne T.C.—In connection with the Highways Committee's report, Councillor Thornton stated with regard to the question of trees he had written to all the medical men in the town, asking their opinion whether there were too many trees in the streets, and if they thought thinning out was necessary. Thirty-one had replied, and twenty-eight were unanimous in thinking thinning out was necessary for the comfort and health of the town; two thought that lopping was all that was necessary, and one thought the trees might remain as they were.

Hull T.C.—A sub-committee has been authorised to take the necessary steps to expedite the Chanterlands-avenue extension and the widening of Hessle-road and Hedon-road.

Llandyssul R.D.C.—The council are making application to the Road Board for a grant for the repair of the roads damaged by Government timber traffic.

Northallerton R.D.C.—The council have a scheme in hand for improving the Langton-on-Swale road, and for this purpose are negotiating for the necessary land.

Plymouth T.C.—A scheme is being promoted for the widening of George-street.

Portsmouth T.C.—The town council have established a committee to prepare schemes for the development of building land so as to provide for playing grounds, school sites, the widening of main roads, and the limitation of the number of houses to the acre.

Richmond (Yorks) R.D.C.—The surveyor, Mr. J. Hodgson, has prepared an estimate, at £150, for repairs to the road at West Sandbeck.

Uckfield R.D.C.—The Highways Committee reported that they have received authority to proceed with the work at Sheep Plane-road, Hurtis Hill-road, Fermor-road and Walshes-road, at an estimated cost of £3,667.

SEWERAGE AND SEWAGE DISPOSAL.

Staffs C.C.—The county council have made application to the military authorities for a contribution towards the cost of laying a larger culvert under the main road near Milford Hall.

Stokesley R.D.C.—It has been decided to lay a new 2-ft. 6-in. culvert under the road leading from Stokesley to Broughton, at an estimated cost of £100.

WATER, GAS, AND ELECTRICITY.

Bury T.C.—The Electricity Committee have decided to link up the town system of electricity with that of the Lancashire Electric Power Company until the proposed extensions can be effected.

Cardigan T.C.—The borough surveyor, Mr. T. Bowen, has been instructed to prepare a report on the water supply.

Chapel-en-le-Frith R.D.C.—The council propose to carry out a water supply scheme at Harpur Hill at an estimated cost of £583.

Chard T.C.—It is understood that the town council will consider the question of the water supply at an early date.

Kilmarnock T.C.—The scheme for the extension of the electricity works, including the installation of a 5,000kw. generator, has been approved by the town council.

Knaresborough U.D.C.—It was stated that the estimated deficit upon the gasworks for the current year would be £780, following upon a deficiency last year of £945. There was, it was asserted, a leakage of gas last year of 6,000,000 cub. ft., and a councillor complained of the "rotten system and the rotten works." The council instructed the clerk to get in touch with a gas expert to overhaul the works and report to the council.

Looe U.D.C.—The council have approved the recommendation of the Water Committee to carry out repairs and improvements at the intake at Wayland and Wringworthy reservoirs.

Stretford U.D.C.—Further powers are being sought with respect to the supply of electricity, including the purchase of the Trafford Power and Light Supply undertaking.

Sunderland T.C.—The Gas Committee are seeking powers for the purchase of land for the extension of the gas undertaking.

Worcester T.C.—The town council have decided to purchase electrically-driven pulsometer pumps at the waterworks for £1,236.

MISCELLANEOUS.

Banffshire C.C.—Plans have been prepared for the construction of light railways from Macduff and Gardenstown to New Aberdour and Fraserburgh.

Bexhill T.C.—The borough surveyor, Mr. G. Ball, has prepared a scheme for the improvement of the bowling green at an estimated cost of £330.

Cardiff T.C.—It has been resolved to purchase certain properties with a view to making extensions possible to the Roath market when the need arises. The approximate cost is £1,550.

Colwyn Bay U.D.C.—It is proposed to extend the boat jetty on the sea-front, at an estimated cost of £584.

St. Helens T.C.—The Tramways Committee have passed a resolution declining to extend the tramway lease, which lapses in October next year, and recommend the corporation to make arrangements to work the tramways themselves.

Walsingham R.D.C.—The highway surveyor, Mr. R. Cannon, and the sanitary inspector, Mr. W. O. Humphrey, submitted a joint letter drawing the attention of the council to the Local Government Board's acceptance of the Conciliation and Arbitration Board's award to the effect that a uniform payment on all salaries of £50 per annum be made where the salary did not exceed £233 per annum. They applied that the award might be extended to them, as their salaries even so augmented would still be very low when compared with the decreased purchasing power of the sovereign. The clerk pointed out that the sanitary inspector was receiving £265 per annum, and the surveyor £300 per annum, including the amount each received from the Fuel or the Food Control Committees, which, in the surveyor's case was £100

per annum. Mr. E. Nelson said he did not consider they should give any bonuses on what they received from other sources beyond their actual salary. The surveyor, who was called in, said the county council had awarded its surveyors more in proportion to what he was receiving, and he did not see that they were doing any more work. He was working week-day and Sunday, and had not even time to read the newspaper for an hour. The chairman said the council had no doubt that he was doing all that he possibly could. Eventually the council decided to increase the bonuses of each from £20 to £50 per annum.

LOCAL GOVERNMENT BOARD INQUIRIES.

The Editor invites the co-operation of Surveyor *readers with a view to making the informaton given under this head as complete and accurate as possible.*

APPLICATIONS FOR LOANS.

Buxton U.D.C.—£570 for a water main.

Plymouth T.C.—£62,545 for the purchase of land for housing

Wigan T.C.—£5,000 for the extension of the electricity undertaking.

LOANS SANCTIONED.

Barnes U.D.C.—£5,500 for electricity extensions.

Hampstead B.C.—£12,923 for electricity plant.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Would it not greatly assist in the solution of the problem as to what should be the method of construction of the road of the future if a conference of road engineers, manufacturers of motor vehicles and those using the roads could be held? Is it not evident that these different interests should if possible go hand in hand in the endeavour to attain the ideal road?

* * * *

How is it that the town council of Ossett have only just come to the conclusion that scavenging work under the contract system has been so unsatisfactory that it must in future be carried out under direct labour by the council? Would this council be surprised to learn that the employment of contractors for the purpose mentioned is a thing of the past, and is as old-fashioned as using horse instead of steam rollers?

* * * *

Apropos of the future traffic, is it not interesting to find that the Ministry of Reconstruction has taken up the matter, and has already been furnished with very useful information bearing on the point by many of the county councils who had been consulted on the subject? Is it not evident that the question of organised motor traffic is of the greatest importance, and would it not be very helpful to those who are studying the question if the Ministry of Reconstruction would be good enough to publish the information they have so far obtained?

* * * *

Is it not evident from the returns that are now published from time to time of the results of salvage operations in connection with house refuse that "the game is well worth the candle"? Do we not read of Birmingham increasing its revenue by £8,000 per annum by such means as they have already adopted, and are not even smaller communities making respectable profits by the simple means of conserving some of the more valuable contents of the dustbin? When modern machinery and intelligent organisation are brought to bear on this salvage problem are we not likely to be astonished at the successful results?

* * * *

Has any trial yet been made—and if so where—of a suggested method of resurfacing very badly worn wood pavements with reinforced concrete? Does not the method proposed by the British Reinforced Concrete Engineering Co., Limited—viz., to roll out the reinforcing fabric and staple it with long staples, so keeping it a little distance off the surface of the blocks and then putting down a fine concrete from 1½ in. to 3 in. thick, seem to have some merit if this concrete face had no tendency to lift or come away from the wood when subjected to the strains and stresses of heavy traffic? Would not such a construction be disastrous to pneumatic tyres in the event of the staples working loose and coming to the surface?

The Cost of War Bonuses.—It was stated at a meeting of Gelligaer Urban District Council that if an application of the officials for an additional war bonus were granted it would mean that the salaries of the officials and workmen's wages, excluding the scavenging staff, would be £16,199 per annum, or a rate of about 2s. 2d. in the £. The matter was deferred.

PERSONAL.

Mr. R. E. Wilson, surveyor, water engineer and inspector of nuisances to the Leinston Urban District Council, has resigned.

Mr. J. K. Bowen, county surveyor of Waterford, has had his salary increased from £400 to £600 a year, with £250 for expenses and the use of a motor car.

Mr. A. T. Blood, surveyor to the Hitchin Urban District Council, was prevented by indisposition from attending the last meeting of the council, and it was stated that this was his first absence during a period of seventeen years.

Mr. F. Pitcher, Mr. A. Barton, and Mr. J. Eastgate, highway surveyors to the Boston Rural District Council, have been voted war bonuses, making their salaries £190 (in the case of Mr. Pitcher and Mr. Barton) and £83 a year in the case of Mr. Eastgate.

Mr. W. S. Woodcock, surveyor of highways to the Oakham Rural District Council, has resigned, and the council have appointed Mr. F. W. Nichols to the position. Mr. Woodcock was congratulated upon the excellent manner in which he had done the work on the roads.

Mr. J. A. Phillips, highway surveyor to the Newton Abbot Rural District Council, has had his salary increased from £170 to £195 a year (including £20 war bonus), and Mr. R. A. Rogers, sanitary inspector, has had his salary advanced from £220 to £280, including travelling expenses.

Mr. W. J. Pallister, surveyor to the Darlington Rural District Council, who has been on active service, has obtained leave, and it is hoped that he will be released soon in order to resume his official duties, this being all the more necessary owing to the recent death of Mr. G. L. Bowron, acting surveyor.

Metropolitan Water Board Engineership.

The Metropolitan Water Board, at their last meeting, decided to appoint a chief engineer at a salary of £2,500 per annum. In reporting to the board the death of Sir J. W. Restler, the last holder of the office, the Works Committee said:—"Sir James was appointed on the staff of the late Southwark and Vauxhall Water Company in January, 1871, and thus completed nearly half a century of continuous and distinguished service to 'Water' London. In 1905 he was appointed deputy chief engineer to the board, and his unrivalled knowledge and experience made him the natural successor of the late Mr. W. B. Bryan as chief engineer in 1914. Important as the London water supply is during times of peace, its maintenance unimpaired during the war became a matter of supreme importance. The great ability and unremitting attention of Sir James Restler in this direction were crowned with brilliant success, for notwithstanding the military depletion of his staff and the postponement of important sources of new supply, the undertaking not only kept pace with normal demands but met also the greatly increased responsibilities attributable to the war. Notwithstanding the burden of his official duties and anxieties, Sir James was only too ready to place his valuable services at his country's disposal, and with the full consent of the board they were utilised by the Admiralty and the Ministry of Munitions in many directions in connection with the war. His more than professional interest in the work of the fire brigade has frequently been remarked, and at the time of his death he was chairman of a Home Office Committee for co-ordinating the work of the London and Extra Metropolitan Brigades. In June last Sir James received the honour of a Knight Commandership of the Order of the British Empire, and it is an additional source of deep regret that he did not live longer to enjoy that distinguished mark of his Majesty's favour. It is unnecessary to enlarge upon the board's loss in the death of an officer who attained such high eminence in his profession and who was held in such universal respect."

INSTITUTION OF WATER ENGINEERS.

WINTER GENERAL MEETING.

The winter general meeting of the Institution of Water Engineers will be held at Burlington House, London, on Friday next, the 13th inst., commencing at 2.15 p.m. At this meeting the election of president and council for the year 1919-1920, and of auditors for the year 1919, will take place, and the following papers will be read and discussed, viz.:—

"The Relation of Rainfall to Configuration," by Carle Salter, joint director of the British Rainfall Organisation.

"Stream Flow and Run-off," by Samuel Hall (Belfast).

"The Freezing of a Reservoir Outlet Works," by Gilbert Christie (Irvine and District Water Board).

An informal dinner will be held in the evening.

Concrete Highway Construction in America.—In America, as the readers of this journal are aware, hundreds of miles of concrete roadway have been laid down by the various local authorities. This form of road construction has now been endorsed by the United States Government, who, in order to facilitate the traffic, are building 12 miles of concrete road round the Fort Worth encampment, Texas. We learn further that in Canada a concrete highway has been planned which will run from Windsor to Toronto, a distance of 225 miles. Now that the war is over the work of laying this road, which is to be 80 ft. wide, will be proceeded with immediately.

FOR OTHER ADVERTISEMENTS

See End of Paper.

COUNTY BOROUGH OF ROTHERHAM.
HOUSING DEPARTMENT.

ARCHITECTURAL ASSISTANTS AND SURVEYOR.

The Corporation of Rotherham invite applications for the following appointments in connection with their Housing Department—two Architectural Assistants at £300 and £250 per annum respectively, and a Surveyor at a salary of £250 per annum.

The appointment will be for twelve months certain, and thereafter must be considered as of a temporary nature.

It is necessary that the Candidates for the appointment of Architectural Assistants should have had experience in Housing, and the lay-out of Housing Estates, and that the Candidates for the appointment of Surveyor should be competent to use a Theodolite and be able to contour level.

Applications, stating age and qualifications, accompanied by copies of three testimonials of recent date, to be delivered to the Town Clerk, Town Hall, Rotherham, endorsed "Architectural Assistant" or "Surveyor" (as the case may be), not later than the 17th instant.

Canvassing members of the Council, either directly or indirectly, will be a disqualification.

CHAS. L. DES FORGES,
Town Clerk.

Town Hall, Rotherham.
December 5, 1918. (3,946)

FOR SALE—Various Books on Civil and Municipal Engineering.—Apply Box 1,680, Offices of THE SURVEYOR, 24 Bride-lane, Fleet-street, E.C. 4. (3,942)

A. M.I.C.E., M.Inst.M. & Cy.E., &c., in responsible position in Home County, desires improve position. Sixteen years' first-class experience roads, &c. &c.—Box 1,678, Offices of THE SURVEYOR, 24 Bride-lane, Fleet-street, E.C. 4. (3,943)

NORTHERN BOROUGH requires the services of a qualified Architectural Assistant capable of taking charge of Housing Schemes under the supervision of the Borough Surveyor. Applicants should have had good practical experience in the preparation of plans, specifications, quantities and estimates, and possess a sound knowledge of building construction.—Application, stating age, qualifications, previous experience, and salary required, to be sent, with copies of not more than three recent testimonials, by the 14th inst., to Box 1,681, Offices of THE SURVEYOR, 24 Bride-lane, Fleet-street, E.C. 4. (3,945)

THE URBAN DISTRICT COUNCIL OF ABERDARE.

The Council invite applications for the appointment of an Architect to devote the whole of his time to an extensive Housing Scheme at a salary of £450 per annum, the engagement to be terminated by three months' notice on either side. Applicants must have had practical experience in surveying, levelling, the laying out of building sites on approved modern lines, preparation of plans, specifications and estimates, and be competent to undertake sole charge of work in connection with and have knowledge of Housing and Town Planning Acts. Office accommodation and necessary staff will be provided by the Council.

Canvassing, either directly or indirectly, will be a disqualification.

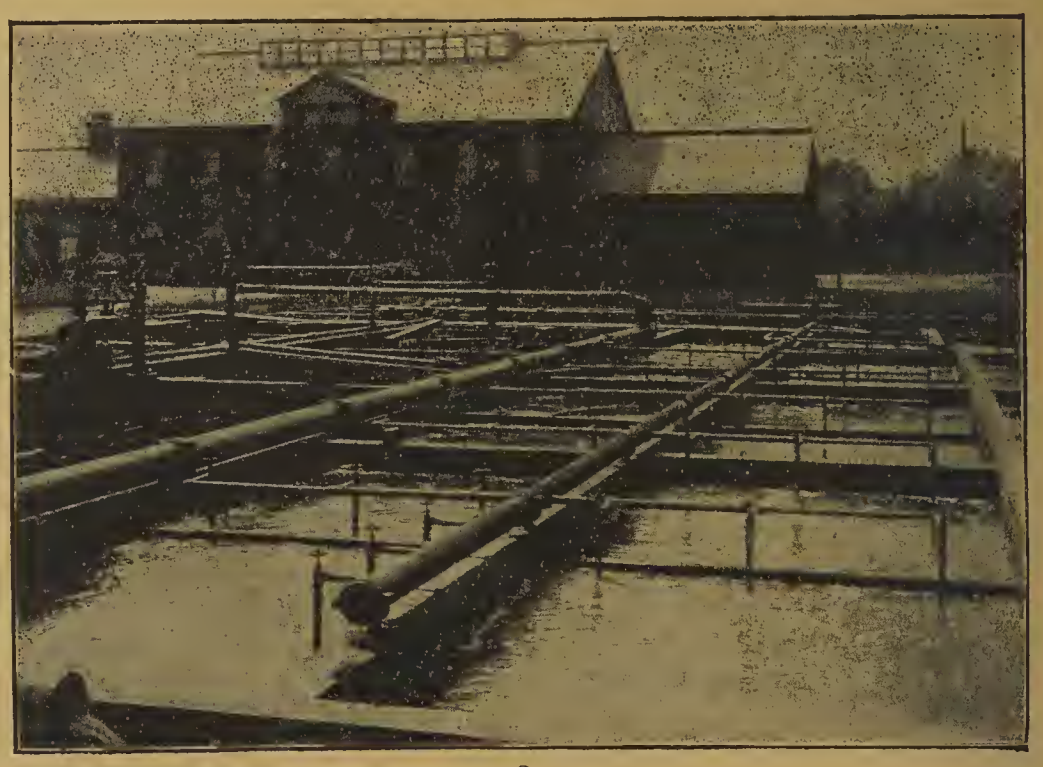
Applications, stating age, qualifications and experience, with copies of not more than three recent testimonials, to be forwarded to the Clerk, Town Hall, Aberdare, not later than Monday, the 6th January, 1919.

(Signed) W. R. MORGAN,
Clerk to the Urban District Council of Aberdare.

Town Hall,
Aberdare,
December 4, 1918. (3,944)

Activated Sludge System of Sewage Purification

See "The Surveyor" issued 15th June, 1917.



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"J and A" Sewage Ejectors, Air Lifts, &c., Booklet S 48.

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Jim is the father of the garage—a man who has been driving motor lorries since motor lorries were. Mike has quite recently graduated from driving a pair of horses to the internal combustion engine.

"THEM 'orses of yours, Mike, must 'ave been like a couple of kids to you! You always drove 'em careful, I'll be bound; you picked the best bits of road for 'em, didn't you, now? O' course you did and more credit to you for doing it, I ses.

But why not pick the road for that lorry of yours, too? Why go driving bumpety bump on and off tram lines when there's no need to, ruining them good Dunlop solid rubber tyres and shaking the innards of the lorry all to pieces? Tram lines and points cuts the life out of a tyre about as quick as a bayonet does out of a 'Un.

Pick your roads, my lad, and give them Dunlop solid tyres the best chance—for the tyres are orl right and if they're used properly, you can't beat 'em."

DUNLOP RUBBER CO., LTD.,
Founders of the Pneumatic Tyre Industry,
Para Mills, Aston Cross BIRMINGHAM.
DUNLOP SOLID RUBBER TYRE FITTING DEPOTS: Belfast, Birmingham, Bristol, Coventry, Dublin, Glasgow, Leeds, Liverpool, London, Manchester, Newcastle-on Tyne, Norwich, Nottingham.

Dunlop solid rubber tyres are obtainable from all leading motor dealers.

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APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

DEPUTY SURVEYOR.—December 9th.—Aldershot Urban District Council. £150-£200 a year.—Mr. D. Ll. Griffiths, clerk, Municipal Buildings, Aldershot.

SURVEYOR AND SANITARY INSPECTOR.—December 10th—For small urban district council in Lancashire. £150 a year.—Messrs. Forshaw, Parker and Company, Solicitors, Preston.

SURVEYOR.—December 10th.—Wellingborough Rural District Council. £200 a year.—Mr. W. Jackson, clerk, West End House, Wellingborough.

BURGH SURVEYOR.—December 14th.—Galashiels Town Council. £300 a year.—Mr. J. B. Lumsden, town clerk, Town Clerk's Office, Galashiels, Scotland.

ROAD SURVEYOR.—December 14th.—Huntly District Committee (County of Aberdeen). £200 a year.—Mr. J. R. McMath, solicitor, Huntly, Aberdeenshire.

ARCHITECT.—December 16th.—East Retford Town Council.—Mr. W. Percival Jones, town clerk, East Retford, Notts.

JUNIOR ASSISTANT.—December 31st.—Doon Town Council. £150 a year.—Mr. W. C. Hawke, borough engineer, Maison Dieu House, Dover.

SURVEYOR'S TEMPORARY ASSISTANT.—Guildford Rural District Council.—Mr. John Anstee, surveyor, Commercial-road, Guildford.

DISTRICT WATER SUPERINTENDENT.—Sutton Coldfield District of the South Staffs Waterworks Company.—Mr. Fred J. Dixon, engineer-in-chief, 26A Paradise-street, Birmingham.

ASSISTANT SURVEYOR.—Blackwell Rural District Council.—Mr. Henry Silcock, surveyor, 67 Westgate, Mansfield.

SURVEYOR.—Staffordshire Agricultural Executive Committee. £3 per week.—Chief Executive Officer, Estate Office, County Buildings, Stafford.

CHIEF ENGINEER.—February 1st.—Metropolitan Water Board. £2,500 a year.—The Clerk, Metropolitan Water Board, 2 South-place, Finsbury-pavement, London, E.C. 2.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Engineering: Iron and Steel.

SOUTHAMPTON.—December 10th.—For supplying and fixing two 10-in. centrifugal pumps and motors, with necessary suction and delivery pipes.—Mr. J. A. Crowther, borough engineer, Market Chambers, Southampton.

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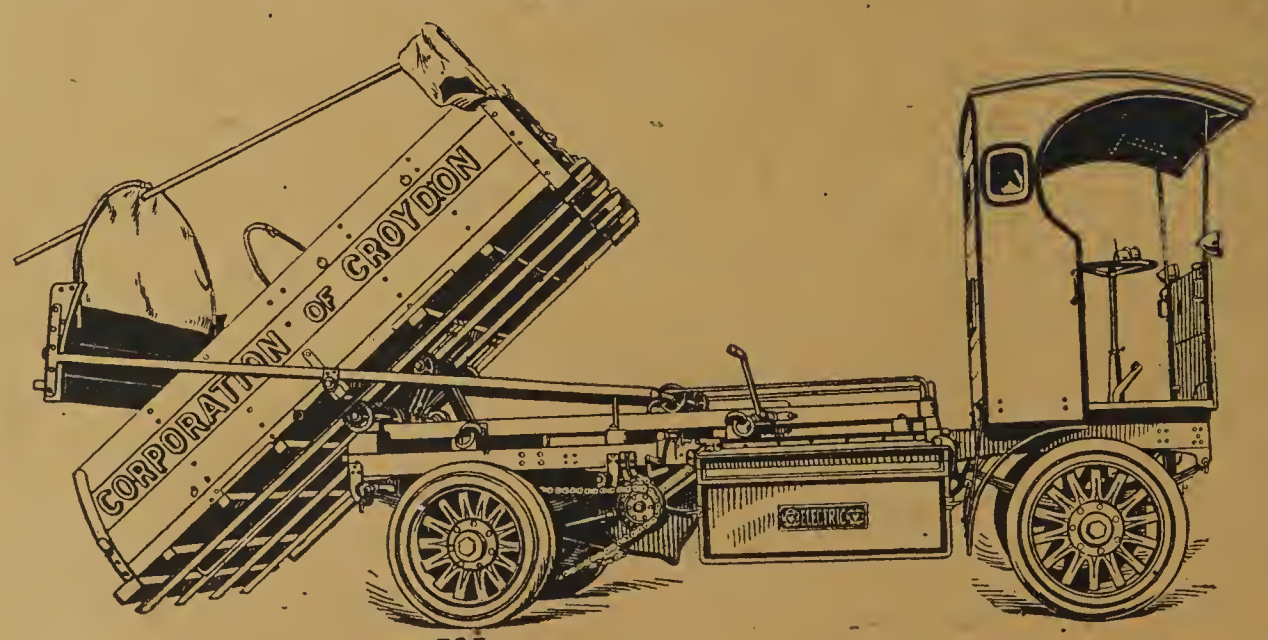

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Cost of collecting with electric wagon	9	4	per ton
Economy in favour of Electric Wagon ...	**2**	**6**	**per ton.**

The work done by the Electric Wagon was equal to three horses."

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39 VICTORIA STREET, S.W. 1.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. DECEMBER 13, 1918. No. 1,404.

Minutes of Proceedings.

Land Acquisition.

Recognising that the period of reconstruction will inevitably witness an enormous increase in the number of applications for the compulsory acquisition of land for various purposes, the Government have been giving attention to the question of a possible simplification of existing procedure by private bill and provisional order. Two committees have been at work—one under the chairmanship of Sir George N. Murray, G.C.B., appointed to consider what steps can be taken to reduce the cost and simplify the process of obtaining Parliamentary powers for the execution of public works generally; and the other, presided over by Mr. Leslie Scott, K.C., whose deliberations were confined to the law and practice involved in the acquisition and valuation of land for public purposes. The latter committee have issued a report of great interest, which was the subject of a paper by Mr. J. D. Wallis, at a meeting of the Surveyors' Institution recently. The main recommendations of this committee are directed to a proposal for the setting up of a "sanctioning authority" which would act according to a much simplified procedure, and whose orders would substantially supersede Private Bill legislation as it has hitherto been known. Municipal engineers who have had any experience of Parliamentary committee work will probably agree with the condemnation of the existing system on the double ground of expense and delay. Moreover, in spite of the relief afforded by the various adoptive Acts and Clauses Acts, by the system of Provisional Orders, and by the grant of confirmatory powers to public departments, the centralisation of a mass of private and local legislation has occupied far too much of the time and attention of the two Houses of Parliament. Any reform, however, must be preceded by the most careful inquiry, both on account of the highly technical character of the consideration involved, and because of the manifest advantages in certain cases of the provision of powers having full statutory force. Further, as far as local authorities are concerned, it must not be forgotten that existing powers in many cases are derived from private Acts, and a change from Parliamentary Committee to "Sanctioning Authority" may lead to a lack of continuity in policy. Be this as it may, however, we are convinced that the days of the Parliamentary Committee as we have hitherto known it are numbered, and it rests with those chiefly concerned to see that their interests are properly safeguarded in any changes that may be made.

* * * *

Loans for Municipal Undertakings.

The movement into the freer atmosphere of post-war conditions is visible on all hands, and one of its signs is an official announcement of the Treasury with respect to the granting of facilities for municipal borrowing. Subject to the continued demands of the State for liberal subsidies, the Government are anxious to relax existing restrictions on capital issues, so far as these are required for the establishment of urgent local services, and municipal authorities are informed that the Local Government Board, or some cognate department, in association with the Treasury, are prepared to entertain applications for sanction to raise loans in order to enable them to carry out schemes of public utility such as housing, sewerage, water supply, gas, electricity, road construction and other works that have necessarily been suspended during the continuance of hostilities. It is stated that it will be impossible to provide large sums from the Local Loans Fund while there still exists the necessity for direct borrowing for national purposes. Local authorities, except the very smallest, are therefore advised to look to the public for loans, and that permission to appeal direct to the public will be granted, or not withheld unreasonably. That opportunity will be taken on a considerable scale, and this permission is not to be questioned considering the large number of urgent schemes that have been held up during the past four years, and we welcome a timely word in support of the proposal by the *Financier and Bullionist*, which remarks that although municipal stocks, by reason of the limited return they offer, are not perhaps the most attractive securities that could be offered to the public, there is no reason to doubt that investors will welcome the opportunity soon to be provided of subscribing for them. But we are warned that these loans will necessarily involve a higher rate of interest than was the case formerly, and also that in these days of redeemable war loans no issue of this class can expect to command support which is not definitely repayable at a fixed date, "preferably not too distant."

* * * *

The Holborn Meeting.

Three very diverse subjects were considered at last Friday's meeting of the Institution of Municipal and County Engineers, at Holborn. In the first place Mr. Spurrell, the borough engineer, gave an account of the very successful communal kitchen which has been established at one of the local swimming baths. Although the first few weeks' operations resulted in a loss, this has been more than counterbalanced by the weekly profit of over twenty pounds that has since been earned. The general opinion appeared to be that the communal kitchen must be regarded purely as a war emergency institution, and that it was not likely to become a regular factor in our social life. Be this as it may, great credit is due for the results already achieved in Holborn and elsewhere. The second paper was read by Mr. James Gair, the highways engineer to the St. Marylebone Borough Council, who was called upon in the Spring of 1917 to organise the collection and disposal of house refuse in the borough by direct labour, the work having been in the hands of contractors up to that date. It was no light task to undertake such a transition at short notice under war conditions, and Mr. Gair's account of the way in which various difficulties were overcome affords an excellent illustration of the capacity of the trained municipal engineer for meeting an emergency. Finally, Mr. A. E. Collins, the city engineer of Norwich, and chairman of the Institution's Board of Examiners, opened a discussion on the education and training of municipal and county engineers. Various standards of general education and degrees of professional training were suggested by different speakers. In the main, we agree with the high standard proposed by Mr. Collins; but local authorities cannot expect to be served by men educated up to university standard, and having the practical experience gained from a long pupilage unless they are prepared to pay salaries commensurate with the direct and indirect expense involved.

* * * *

The Concrete Institute.

Mr. H. D. Searles-Wood, the new president of the Concrete Institute, devoted a great part of his recent inaugural address to the important subject of research, a matter in regard to which the institute has hitherto displayed considerable activity. In view of what has already been accomplished during a very difficult period, it is a little unfortunate that the Department of Scientific and Industrial Research has found itself unable to recommend a continuation of the grant-in-aid, being of opinion that "the research should be suspended until more co-ordination and continuity of effort can be secured under adequate supervision." Hitherto the work has been carried on in the laboratories of certain universities, and the criticism referred to seems to have been directed primarily against the cost incurred in fitting up a special laboratory at Manchester. We hope that it may yet be possible to adjust the matter, for it would be a great

pity, particularly at the present time, if the progress of important and necessary research work were impeded by reason of a difference of opinion as to the precise method to be pursued. Mr. Searles-Wood also referred to the work of the institute with reference to the relation between architects and specialist engineers; the standard specification for reinforced concrete, which is now nearly ready for publication; the "Recommendations to Clerks of Works and Others Engaged in the Execution of Reinforced Concrete Work," which are also about to be issued; and the reconstruction of the building industry after the war, with special reference to the report of the Materials Committee of the Ministry of Reconstruction. As regards the last mentioned matter, we cordially agree that every effort should be made to terminate the present control at the earliest possible moment, and we trust that the efforts of the proposed Regional Committees will be directed to this end.

* * * *

Allotments and Piggeries.

Now that the great struggle which has convulsed Europe for more than four years is practically over, it is perhaps not inopportune to look back and recall the part played by local authorities in connection with the maintenance of the food supply. In most districts the vast increase which has taken place in the number of allotments has thrown a great deal of work on the surveyor's department, and this work has been cheerfully undertaken and well done. If these allotments are to be retained, and waste lands are to be kept under cultivation, further legislation will be necessary, and it is to be hoped that this will be introduced before the lessons of the war are forgotten. Another way in which local authorities have assisted in the great national food production campaign has been by the establishment of municipal piggeries. These undertakings also might with advantage be continued after the war, if only on account of the outlet which they provide for the profitable use of waste food. That municipal piggeries are capable of being run at a profit is shown by what has been accomplished at Bognor, where the first sixteen months' working—under the capable direction of Mr. Oswald A. Bridges, the town surveyor—showed a profit of £30, after allowing for writing off the cost of the buildings over a period of five years. Those places where profits of this kind have been made will naturally not be reluctant to continue their enterprises, and others might well even now follow the example they have set.

NOTES ON ROAD CONSTRUCTION AND MAINTENANCE.

By Thomas Bowyer Bower, assoc.m.inst.c.e.*

Roads are one of the most important of an Army's needs. The improvement of the roads of the United Kingdom is a subject of increasing importance, and experience shows that the possibility of military considerations becoming involved should not be neglected in their design and construction.

The average English roads and by-roads are, as a rule, well made, but to carry military traffic they should be not less than 24 ft., and, if possible, 30 ft. wide.

The roads of France, chiefly constructed under Government supervision, were excellent for the traffic likely to use them.

For civilian traffic in peace time, consisting chiefly of slow carts and light motor cars, they are no doubt adequate, but both construction and material—largely a friable limestone—have proved unsuitable for heavy and fast military traffic. The original good condition of the roads, with favourable weather, delayed the appreciation of this, but after the second winter of hostilities, the road surfaces having become bad, frost got into the foundations, and with further increase of traffic the roads got into a deplorable condition. Material was scarce, and temporary measures had to be adopted.

The commonly accepted view that the excessive amount of mud on the roads of France is due to the metal being forced down to the chalk or other subsoil, which then comes to the surface as mud, is disputed by the author. Excepting the case of *pavé* roads, and roads badly worn in holes, he is of opinion that no mud rises to the surface by pressure from above. The true cause of mud formation is the poor quality of the material used—viz., limestone of very soft and porous nature, which, by attrition through some inches of depth, forms the mud, while destroying the surface. The only other materials available in France were pit-props, whole or split, brick rubble, and a poor quality of flint gravel.

The author then describes methods of repairing holes, deep holes being dealt with by "pigstying" with pit-props, filled in with earth and covered with a foundation of soling rock and a coat of macadam.

The author has reached the conclusion that there is but one way, as now given, of constructing a road fit to stand abnormal traffic for long. Drainage must first be dealt with. No ditch should be nearer the road than 6 ft., the bottom being 1 ft. below road formation. Side drains from road edge to the ditch should be not more than 50 ft. apart. If the road on one side cuts into a hill slope, culverts must be formed under the road leading from one ditch to the other—these, whether of stone slabs or wood, should not be less than 18 in. square. Side-tilted roads draining across the surface are to be avoided. The edge of the road next the falling ground, if wanting from any cause the 6-ft. margin between the road and the ditch, must be securely supported to take the pressure induced by road traffic, which has a tendency to push the edge of the road outwards, causing the road to lose its camber. A method of securing road edges is then described.

Road excavation must be taken out across the whole width to 18 in. below the finished road surface, the bottom being curved to conform to the road camber, which may vary between 1 to 12 and 1 to 50, 1 to 25 being a fair average.

It is well to have upon the ground soling rock, seconds and macadam, in advance of excavation, to avoid delays which may expose the foundation to weather influences. Excavation being completed, the bottom is covered with a 2-in. layer of ashes or clinker; this, though not essential, is desirable. The soling rock is then packed and rolled as already described for mending holes. Where the soling rock, when set and keyed, is rough it will be well to hand-pack the rock seconds that come next, if only for one stone thick, "throwing in" to make up the desired thickness; 9 to 12 in. of soling rock is sufficient. If this is not procurable, hard block chalk will serve, though not so good. The "seconds" should be from 4 in. to 6 in. thick, as also the macadam finish. Each layer should be rolled as completed.

This makes a good road, easily maintained, and serviceable even when the macadam is worn away.

Corduroy roads are possible only in a well-wooded country, and last but a short time unless well covered with metalling, without which the foundation soon becomes wet and soft, with consequent disturbance of the timbers.

To construct a good corduroy road attention must first be given to drainage and excavation carried out as for metalled roads, when "beds" to receive the longitudinal stringers should be excavated, one on each road edge and one at the centre, with two intermediate channels, the centre channel being of width sufficient to take two timbers spaced 2 in. or 3 in. apart.

When laid the corduroy must be secured by $\frac{1}{8}$-in. diameter wire, fastened by staples to each timber. At every 15 ft. it is desirable to drive pickets, to secure the timbers from shifting. On completion the corduroy should promptly be covered with a thin layer of ashes or dry soil, followed by a layer of seconds and macadam well rolled in.

Some principal faults in road construction are: Delay in drainage arrangements until late in the work; careless laying of soling rock on irregularly formed bottom; packing soling rock on edge with length of stones transverse to road, in which case the stones are liable to tilt forward in the direction of traffic, with consequent disturbance of road surface.

* Abstract of paper read at a meeting of the Institution of Civil Engineers on the 3rd inst.

PATCHING OF WOOD-PAVED ROADS.

HOLBORN'S METHODS.

In the course of the paper which he presented at last Friday's meeting of the Institution of Municipal and County Engineers, Mr. E. F. Spurrell, the borough surveyor, furnished some particulars of the methods adopted in Holborn for patching wood-paved roads. "Aztecphalte," introduced by Messrs. Constable, Hart & Co., was employed as a surface coat.

The component parts of "Aztecphalte," said Mr. Spurrell, were known only to the manufacturers, but the material contained among other ingredients limestone dust, washed sand, and Mexican bitumen. The old blocks were taken away (for re-use elsewhere) and in their place a bottom coat of $2\frac{1}{2}$-in gauge of bituminous slag and a top coat of "Aztecphalte" $1\frac{1}{4}$ in. thick was laid, the depth of the complete material varying according to the depth of the adjoining wood blocks. There were, of course, other similar materials on the market, but Mr. Spurrell has found that this particular material has given good results not only for the patching of wood-paved roads, but also for use in roads subjected to heavy traffic.

Demobilisation of Pivotal Men.—The Surveyors' Institution has been asked by the Director-General of Demobilisation to assist in securing the release from the Navy, Army and Air Force of surveyors who may be looked upon as pivotal men—*i.e.*, men who, if released, would at once be engaged in preparing schemes of constructive work such as building, road making, drainage, afforestation, agriculture, &c., which would provide employment for other men on demobilisation.

Education and Training of Municipal and County Engineers.

DISCUSSION AT THE HOLBORN MEETING.

In September last the Engineering Training Organisation inquired if the Institution of Municipal and County Engineers would set aside an ordinary meeting for the discussion of engineering training in order to assist the organisation in its work of obtaining a complete set of memoranda dealing with the special features of training appropriate to the different branches of engineering. The organisation has issued a valuable statement on the education and training of engineers in general. The co-operation of the members is asked in particularising the requirements of the municipal engineering branch of the profession, and Mr. Arthur E. Collins, M.INST.C.E., past president and chairman of the Board of Engineers of the institution, was asked to open the subject. The statement referred to was prepared by Mr. A. E. Berriman, chief engineer to the Daimler Company, Coventry, and copies of it are obtainable from Mr. Berriman.

Introducing the subject at last Friday's meeting of the institution at Holborn, Mr. COLLINS gave it as his opinion that an entrant to municipal and county engineering should be a youth of good character, manners, health and education, who had matriculated or passed an equivalent qualifying examination. If he had been educated at a public school it would be to his advantage. He should be articled to a municipal or county engineer for three years. The first year should be spent in the practical work of his master's department, including drawing office, surveying, laying out and supervising of works and workmen, and visits to engineering workshops. The office experience must include correspondence, accounts, time-keeping, specifications, quantities and routine work. In a year a general knowledge of routine and practice should be obtained. The pupil should then proceed to a university for a three years' course, preferably one in which there was a chair of municipal engineering. At the expiration of this course he should return to his master and complete his articles. In some towns it was possible to serve articles and attend a university concurrently. In the opinion of the writer this was not as advantageous as the course already outlined, as the office and class hours must clash. Again, with some universities it was possible for the practical office and works experience to be obtained in the summer half of the year, and to attend the university in the winter. The general principles underlying engineering were the same for all, but the municipal branch of the profession required particular study of the following subjects and facility in their application: Office and works organisation; prices and costs of works; designs; specifications; reports and clear exposition to committees, &c. The practical engineering subjects included geodesy; sewerage and sewage treatment; waterworks, water supply and distribution; tramway construction; road construction, maintenance and cleansing; collection and disposal of domestic refuse; building construction and materials; drainage, heating and ventilation of buildings; town planning; municipal and public health law and by-laws relating to the above subjects; the general principles of architectural design. A municipal engineer should have somewhat more than a bowing acquaintance with chemistry and bacteriology, so that he might fully grasp the meaning of reports of chemists and bacteriologists on questions of sewage, water, materials and so forth. It was very obvious that a municipal or county engineer qualified on the lines sketched was a very valuable member of society, who should be honoured and rewarded accordingly.

Mr. E. WILLIS, engineer and surveyor to the Chiswick Urban District Council, suggested that the matter was rather too big to discuss that evening; it would bear a great deal of thought. He had seen the statement issued by the Engineering Training Organisation, but in connection with their own profession he felt there was more than one phase of engineering with which they had to be acquainted, and the statement in question did not deal with the services outside and directly connected with engineering with which municipal engineers had to familiarise themselves—services outside the work of the ordinary mechanical, electrical or civil engineer. As to whether during a youth's training the break after the first year was desirable, he had not made up his mind; but he agreed that some college course was necessary, and he was in sympathy with apprenticeship of some kind.

Mr. F. WILKINSON, borough engineer of Deptford, said he thought it was a very opportune moment for Mr. Collins to bring this subject forward. He did not quite agree with his outlines of training for a young engineer. In his opinion the ideal education for a young man was for him to get his degree or diploma for engineering by the time he was eighteen or nineteen years of age. That would give him a sure foundation in the principles of mechanics and other subjects on which to build a sound practical training. Then he should commence a two to three years' apprenticeship in an office, so as to finish when he was twenty-one, his further technical education then to run concurrently with his pupilage, so that by the time he was twenty-three he would be able to take the Institution of Municipal and County Engineers' examination and successfully cope with it. If the institution did not raise this examination to a higher level, he felt that the future would offer no inducement for a young man to enter the profession, and if this were not done they would never get the status they were aiming at.

Mr. C. BROWNRIDGE, borough engineer of Birkenhead, said that, in contradiction to Mr. Wilkinson, he would suggest that the pupil or apprentice should get his general theoretical and scientific education done with before he entered an office, and then devote himself more or less to applied science specially applicable to the work he had to do in the office. They were all familiar with cases of pupils who had obtained the qualifying diploma to take their own examination or the examination of the Institution of Civil Engineers, having to apply themselves to scholastic studies which ought to have been finished with before coming to the office. The municipal engineer had always to be a student; consequently they ought not to expect their apprentices to understand everything appertaining to the profession. His view was that general education in the future was going to be different to what it had been in the past, and it was going to be such as to enable any youth with brains or ability to pass examinations such as the institution examination. They wanted to encourage youths with brains, and brains should be the qualification. That being so, he would like to say that in dealing with the question of the education of the pupil, they also required to watch over what he would term the pupil farm. There were offices in which an undue number of pupils were taken with the object of getting premiums. These youngsters were not dealt with fairly, and on being thrown on to the market did not do credit to the profession. Mr. Collins had outlined a six years' pupilage. That was too long. The first year he should serve in a municipal or county engineer's office. He would there give power to either the master or the pupil to determine the articles, because while a youth might think at first that he had a liking for municipal engineering, he might later find that it was different to what he expected. He agreed that the next two years should be spent at the university or a proper technical institution where the youth could get a good grounding in science, but at the end of the period the youth with ability—natural ability—would have become a most useful member of the office staff, and would in due course come into touch with all the subjects Mr. Collins had outlined. In any case he doubted whether any youth after the completion of three years in the manner he had suggested would be willing to serve a further three years in the office, unless the question of payment was dealt with. In his concluding remarks Mr. Collins had expressed the opinion that a municipal or county engineer qualified on the lines which he had sketched was a very valuable member of society, and should be rewarded accordingly. That was very important, but if their assistants were going to be paid a less wage than a carter, one could not expect many to join the profession, and anything the institution could do in the direction of improving training and remuneration would be a most useful work.

Mr. W. JONES, deputy borough engineer, Deptford, submitted the following communication: In order to get a satisfactory road a good foundation is necessary. This maxim is also applicable to the profession of a municipal engineer and surveyor. In order to get a good engineer and surveyor, a proper foundation is absolutely essential, and in this case it should be the standard of education which should be insisted upon before any person can be allowed to enter the profession. The examinations I would suggest are the London Matriculation, or Oxford or Cambridge Senior Examinations. Some engineers insist on an intended pupil qualifying at a university as a Bachelor of Science before commencing his articles. The parents in this case are put to a considerable unnecessary expense, and the benefits derived by the man in after life under the present system do not warrant any such expense. Say the student leaves school at the age of sixteen years, by the time he has got his degree and served his period of articles, he is at least twenty-two years of age, and then was offered in pre-war days the glorious sum of 25s. to 30s. per week, with annual increments of £10 per annum to encourage him to improve his knowledge. Such appointments were generally advertised at a certain figure per annum because it sounded so nice to the ears as a lump sum. If this amount was worked out at so much per week, then it turned out to

be a paltry sum, even lower than a stonemason's, or in some cases a labourer's wages. The Civil Engineers' Examination seems to be the hall-mark of our profession, but why it should be I do not know. It is to be hoped that at a time not very far distant the Institution of Municipal and County Engineers' Examination will be raised to a much higher standard than even that of the civil engineers, and there is no reason (provided of course the present system is revolutionised) why this should not be. There are several ways in which the status of the municipal engineer and surveyor could be raised in the immediate future, and I beg permission to enumerate them briefly: The examination of the Institution of Municipal and County Engineers should be a hall-mark of our profession, and the standard should be raised in the following ways: (*a*) That the entrance examination as previously described should be passed by the pupil before commencing his articles, and this should be insisted upon by all chief officials. (*b*) The Board of Examiners should consist of independent and eminent gentlemen who are preferably not members of the institution. (*c*) Examinations should consist of subjects which completely embrace the whole of the varied and numerous works which an engineer is called upon to perform. At the present time no series of examinations of any one institution answer the purpose, to my mind. I would suggest that applicable subjects be chosen from the examinations held by the following bodies: (*a*) Municipal and County Engineers. (*b*) Surveyors' Institution. (*c*) Institution of Civil Engineers. (*d*) Royal Institute of British Architects. The examinations could consist of three parts, no one part to be passed in a less period than one year. The student could thereby qualify after three years' hard study. (*e*) No member should in the future be allowed to gain admission to the institution without passing at least one examination laid down by the institution. On passing the first examination, the candidate might be given associate membership, and after passing the whole of the examinations, transferred to the class of member on attaining a suitable age. (*f*) The present list of members should be revised and those who have not passed the examination of the institution or qualified as associate members of the Institution of Civil Engineers, or passed the Surveyors' Institution examination, should be given a specified time, say two years, in which to qualify as a member under the existing examination conditions. If these members do not qualify in this period, their names should be removed from the register. The suggestions given above may seem almost drastic, but I am of opinion that only very strong measures are of any use if the future of the young engineer is to be safeguarded. Now is the time for action, not the future. . . . My suggestions would do away in time with the so-called engineer and surveyor of the road foreman type, whom we often meet in smaller boroughs, because each small urban or rural district could at all times have a young engineer, properly qualified, who has had a good education and sound practical training. Security of tenure could be got much easier if such conditions could be brought about.

Mr. H. T. Wakelam, county engineer of Middlesex, after recalling that the subject under consideration was dealt with at the annual meeting at Hastings, said he could not help thinking that it was too important a matter to discuss at a gathering like the present. He thought they ought to recommend the council to form a committee chosen from the institution as a body to deal with the subject and formulate a scheme which might be submitted to the next annual meeting, to see whether the members generally were in accord with the suggestions of the committee. As to the length of pupilage and apprenticeship, he served five years without remuneration, and did not regret having done so, and whether four or five years, he thought that was the proper course to pursue. If in order, he would move a resolution on the lines he had suggested.

Mr. J. Sutcliffe, borough engineer of Woolwich, expressed the opinion that the profession had been deteriorating for a good many years previous to the war, and he could best indicate his own attitude by saying that, while he hoped his own son would become an engineer, he had made up his mind that he would not be a municipal engineer. He did not stand alone in that; many of his brother engineers were of the same opinion, but he thought that the lessons of the past three years provided a great opportunity for giving a fillip to the profession of municipal engineering. As regarded the Engineering Training Organisation, he did not quite understand what this organisation was, and what authority it was going to have with regard to any report with which it might be furnished by the institution.

On the proposition of Mr. Wakelam, seconded by Mr. Wilkinson, it was decided that the council of the institution should be asked to appoint a committee to make a report, the report to form a subject for discussion at the next annual meeting.

Replying upon the discussion, Mr. Collins said he did not see any hope of the profession being what it should be, unless it was a closed profession, and until they were fairly well thought of, they could not expect to make it so. He could not agree that under his scheme a pupil would get out of touch with the profession while going through his college career; under the scheme he had propounded, the youth would serve the first year of his articles in the office, and after going through a university course of three years, he would return to his master for two years. He thought the idea of making it possible to terminate the articles after twelve months a good one. As regarded Mr. Wilkinson's suggestion, that the young engineer's education should be continued concurrently with his practical work, he was afraid that would involve too great a strain and was too much to expect. In conclusion, Mr. Collins said the Engineering Training Organisation was a voluntary body in no way antagonistic to them, its object being solely to formulate some suggestions that might be of guidance to those contemplating the adoption of engineering as a profession.

MUNICIPAL OFFICIALS' DEMANDS.

A LONDON RESOLUTION.

A conference convened by the Paddington Municipal Officers' Association (affiliated to the National Association of Local Government Officers) was held at Caxton Hall, Westminster, recently. Delegates were invited from the staffs of all the Metropolitan municipal authorities. The meeting was well attended, the majority of the boroughs and the London County Council being represented. Under the able chairmanship of Mr. Eggleden (Paddington) an interesting discussion bearing on many subjects of vital and immediate importance to the municipal service took place.

It was recognised that the municipal service was, like all other professions and industries, in a position where it must either advance or recede. To advance, greater activity was needed on the part of those protecting its interests, and the enthusiasm of the "rank and file" must be aroused, enlisted and sustained, if the movement were to be properly supported.

The following resolution was adopted by the conference—viz.:—

"That this conference of delegates representing the staffs of the metropolitan borough councils adopts the following propositions, and urges the several metropolitan local associations to appoint to the Metropolitan District Committee of the N.A.L.G.O. delegates in sympathy with these principles; and that efforts be made to induce all municipal officers in the Metropolis to become members of the N.A.L.G.O.:—

"(1) That all metropolitan municipal officers, whether male or female, should receive a war bonus equivalent to that granted to Civil Servants.

"(2) That payment should be made for all work after office hours.

"(3) That all officials returning from service with H.M. Forces shall resume their official appointments at salaries which, taking into consideration the increased cost of living, they might reasonably have expected to attain had they continued in the active service of the council.

"(4) That uniform rates of pay should be made to all officials throughout the Metropolis for similar work in the clerical, technical, and professional branches, and that London should be treated for all purposes as a separate entity.

"(5) That steps should be taken to secure tenure of office.

"(6) That a uniform scheme for superannuation allowances should be established.

"(7) That where both men and women are employed the basis of remuneration should be equal pay for equal work.

"(8) That consideration should be given to the question of affiliation with associations and societies representing the Civil Service and other kindred bodies.

"(9) That consideration should also be given to the proposal for a mass meeting of all metropolitan municipal officers."

Penderyn Waterworks Award.—Mr. G. Midgley Taylor, M.Inst.C.E., has published his award in the arbitration between Messrs: William Underwood & Brothers, contractors, and the Mountain Ash Urban District Council. The arbitrator has awarded £2,557 19s. 11½d. in respect of the contractors' claims for extras amounting to £13,688 7s. 6d., and the council are to bear two-thirds of the costs of the award and one-third of the contractors' costs of the reference.

Roadmen's Wages in Ireland.—With reference to the proposals of the Cork county surveyors for the maintenance by direct labour of certain roads in the several rural districts of the county for the period of three years commencnig on April 1, 1919, the council have decided to pay the labourers a general flat rate of 27s. 6d. per week throughout the county, with the exception of the Cork rural district, the rate for which was fixed at 32s. 6d. Gangers were granted an increase of 5s. a week over the labourer, and the rate for horse-hire was left in the hands of the county surveyors, a limit of from 11s. to 14s. a day being, however, adopted.

Organising a Department for the Collection and Disposal of House Refuse During the War.

By JAMES GAIR, Assoc.M.Inst.C.E., Highways Engineer to the St. Marylebone Borough Council.*

The Metropolitan Borough of St. Marylebone has a population of about 120,000 and an area of 1,506 acres. Prior to March, 1917, the collecting and disposing of the house refuse of the borough had always been carried out by contract, the contractor for a lump sum providing all the necessary plant, horses, labour and finding a shoot for disposal. The contract price for this work before the war was £12,495, but as the difficulties inseparable from the war increased the price was raised for the year 1916-17 to £19,924, and in January, 1917, the contractors asked for a further 25 per cent increase, and for the penalty clauses in the contract to be waived. This the borough council were unable to accept, and on February 18, 1917, the council decided that this work should be done by direct labour, and the author was instructed to make arrangements for the work to be taken over by the council on April 2, 1917. The council having no horses or plant available for this work, it was decided to purchase ten 2-3 ton Austin motors, fitted with special tipping bodies, and to increase the council stud by twenty horses. Steps were also taken to purchase and hire dust vans; but when all the foregoing arrangements were nearly complete, a new difficulty arose owing to the motor lorries being commandeered by the War Office immediately they were ready for delivery. However, with the co-operation of the boroughs of Paddington and Hammersmith, who kindly assisted with the hire and loan of dust vans, a start was made, the delivery of the motors not being completed for some months later.

As regards labour, the motor drivers were selected from the council's staff and trained, and the dustmen previously employed by the contractors nearly all applied for employment with the council.

The council not having a destructor, it was decided that the whole of the refuse should be conveyed to a shoot. A wharf on the Paddington Basin of the Grand Junction Canal was therefore temporarily rented, this wharf being within a 3-mile radius from any part of the borough. A fleet of twelve wide canal boats, capable of holding from 40 to 45 tons of house refuse, and a tug fitted with a 40-h.p. Khromout oil engine were purchased, and a disused clay pit of about 2 acres, and from 30 to 40 ft. deep, was leased at Northolt, about 10 miles down the Grand Junction Canal from the wharf on the Paddington Basin. This site, it was estimated, would provide a shoot for at least two years. At the shoot the refuse is loaded from the canal boats by hand labour on to tip wagons running on a 27-in. gauge light railway, a distance of about 200 yards to the tipping plant. A 5-ton locomotive crane, fitted with a "Williams" patent unloading grab, has now been installed, and this has enabled the unloading to be done more economically and expeditiously.

St. Marylebone, like every other borough or district, has its own peculiar difficulties that have to be dealt with in arranging a system of collection of house refuse. In the main shopping thoroughfares there is a daily kerb collection between 9 and 10 a.m., also a daily collection from the large business houses, hotels, restaurants, hospitals, nursing homes, residential flats, &c.; other parts are cleared two or three times weekly, the purely residential part of the borough being dealt with largely by a weekly collection.

SALVAGE PLANT.

In August, 1917, the council purchased the leases of a group of wharves on the north side of Paddington Basin. These wharves had been used by dust contractors and fitted with a dust-screening plant erected some twenty or more years ago. When the council took possession of the wharves the whole of the buildings and plant were in a most dilapidated condition; the screening plant had not been used for a long time, and the furnace, boiler and engine were all badly in need of repairs, so that it was not until the end of October that the screening plant could be got into anything like working order. The first idea was to salve the waste paper, which was then very plentiful, and the old tins, and to obtain a residue that could be disposed of more economically than by conveying the house refuse straight to the shoot. Since November, 1917, the plant has been in operation. The screening plant consists of an iron grating about 36 ft. long and 9 ft. wide (four dust vans can tip simultaneously on to the grating), the bars of the grating being about 2 in. apart. The whole of the refuse is shot over this grating, and by hand labour the old tins, paper, rags, bones and all saleable materials are picked off. The fine dust, ashes, cinders, &c., fall between the bars on to a conveyer, which discharges it on to an oscillating screen or sieve 8 ft. long by 4 ft. wide, the bottom of which is formed of steel plates perforated with $\frac{7}{16}$ holes. The material which passes through the screen is termed "fine ashes," and is sold to market gardeners, farmers and allotment holders. The material passing over the end of the screen is called "breeze," and is really a low-grade fuel, and is sold as such for steam raising and brick-making. Experiments have been made to ascertain the results obtainable after washing the "breeze." These have been considered so satisfactory that a mechanical breeze washer, capable of dealing with 40 to 50 tons of material per day, has been on order from the Grange Iron Company, Durham, since May, but unfortunately delay has been experienced in obtaining delivery.

The salvage of paper from the refuse has been given considerable attention, and with a view to doing this mechanically the discharge from the screen is conveyed into a wooden box or aspirating leg, at the top of which is fixed a Sturtevant fan driven at about 1,500 r.p.m. The paper then passes through the fan into a separator and discharges into a basket. The author cannot yet state whether this method will prove successful, as the fan, after months of delay, has only just been fixed. The power to drive the plant is obtained by burning the waste débris collected from the grating under a Babcock boiler, the engine being one of Marshall & Sons', Gainsborough, 30-h.p. single cylinder.

The old tins are put through a de-soldering furnace and pressed into bales by means of an hydraulic press supplied by Messrs. Hollings & Guest, Birmingham. The tins, after baling, are sold to Messrs. H. Levin, Webb & Co., Stratford; this firm also erected the de-soldering furnace at a cost of £90. The waste paper is also baled by means of an hydraulic press and sold to Messrs. Jackson's Millboard and Paper Co., Bourne End, Bucks. The rags are sorted and packed into sacks and sold to Messrs. Harris & Sons, Mill-street, S.E. The bottles are sorted and disposed of to various firms.

The following are the results obtained by the council from the sale of the various waste materials from November, 1917, to October 31, 1918:—Waste paper, 402 tons, £3,418; bones, 12½ tons, £170; broken glass, 28½ tons, £75; bottles, 1,000 gross, £341; rags and sacking, 78 tons, £658; old tins and scrap iron, 334 tons, £663; fine ashes and breeze, &c., £566; total, £5,889.

THE FUTURE.

At the present time, in view of the cessation of hostilities and the prospect of an early return to more normal conditions, the question arises whether these results are likely to be maintained in the future. In any case there is no doubt that it is the duty of every municipal engineer to consider carefully whether some system cannot be devised for salving the waste materials that pass through his department. Can this best be done by compelling each householder to keep in separate receptacles the organic and inorganic waste, or by screening and sorting at a depot, and are the results obtainable likely to be financially successful? These points every engineer, knowing the local conditions, must investigate and decide for himself. The author therefore makes no special claim for the plant described, except that an attempt has been made with the apparatus at hand to salve the waste materials urgently required for national purposes. Whether the screening method is likely to establish itself remains to be seen, but it appears more than likely that in the future a screening plant designed on simple, modern lines will be considered a necessary addition to any new dust-handling plant or destructor.

The capital outlay by the council in establishing this department was approximately £15,000, including motors, vans, horses, barges and tug, steam crane, and including acquisition of wharves, plant, tools, &c, and the estimated working cost £20,000 for the year ended March 31, 1918.

* Paper presented at a meeting of the Institution of Municipal and County Engineers held at Holborn and St. Marylebone,

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Manchester Improvement Scheme.—A comprehensive scheme of town planning on the south side of Manchester is being considered by the corporation. One of the features of the scheme will be a new road several miles in length, cutting practically through the heart of South Manchester.

Parliamentary Candidates and Superannuation.—It has been suggested that members of the Institution of Municipal Engineers might approach parliamentary candidates in their respective constituencies asking them whether they would be prepared to vote for superannuation for municipal officials. The suggestion is regarded as one well worth acting upon, and the secretary will be glad to have particulars of any pledges which may be obtained.

Institution of Municipal and County Engineers.

MEETING AT HOLBORN AND MARYLEBONE.

A variety of important subjects came before the members of the Institution of Municipal and County Engineers at last Friday's meeting of that body in the metropolitan boroughs of Holborn and Marylebone, the matters considered including communal kitchens, mechanical street cleansing, refuse disposal and salvage, and professional training. In the course of the day inspections were made of the Holborn National Kitchen in Endell-street, Shaftesbury-avenue, and of the Marylebone Council's salvage plant at North Wharf, Paddington, and a demonstration of street cleansing machines and of the methods adopted by the Holborn authorities for the patching of worn wood-paved roads formed other interesting items in an altogether excellent programme. The several questions were afterwards dealt with in brief papers by Mr. E. F. Spurrell, the borough surveyor of Holborn, Mr. James Gair, highways surveyor to the Marylebone Borough Council, and Mr. A. E. Collins, past-president and chairman of the Institution's Board of Examiners. The attendance at the meeting included Messrs. J. Patten Barber (Islington), J. P. Bennetts (Harrow), J. Birch (East Ham), H. E. Blain (London General Omnibus Company), H. Percy Boulnois (Westminster), W. L. Carr (Ruislip-Northwood), R. H. Clucas (Kingston-on-Thames), A. E. Collins (Norwich), A. P. I. Cotterell (Westminster), T. B. Crookes (Finsbury), A. E. Darby (Bethnal Green), W. Davies (Leamington), E. J. Elford (Cardiff), J. B. Fallowfield (Gold Coast), J. Gair (Marylebone), R. M. Gloyne (London C.C.), F. B. Goodeman (Ryde), A. T. Gooseman (Blackburn). C. C. Hannock (Warminster), J. R. Heath (Swansea), J. How (Wealdstone), G. W. Humphreys (London C.C.), W. H. Jarvis (Erith), W. Jones (Deptford), J. J. Kennan (Leamington), P. J. Killick (Finsbury), E. P. Mackay (Romford), H. Mair (Hammersmith), F. Massie (Wakefield), E. F. Morgan (Croydon), E. E. Ryder (Bushey), H. Shaw (Ilford), E. F. Spurrell (Holborn), J. Sutcliffe (Woolwich), H. Walker (Wealdstone), R. A. Webb (Lagos), C. F. Wike (Sheffield), F. Wilkinson (Deptford), and F. Wood (Fulham).

Assembling at the Holborn Council offices, the members were accorded a hearty welcome by the mayor, who, in the conrse of his observations, remarked that Holborn, though it happened to be one of the smallest metropolitan boroughs, was curiously like the City of London, inasmuch as, although the number of people within its borders during the working hours of the week was about 1,500,000, the resident population was not more than 40,000.

Mr. H. Percy Boulnois, past-president—who occupied the chair at the outset—acknowledged the welcome, and Mr. Spurrell followed with a few words expressive of the pleasure it had given him to arrange the gathering, a task in which he said he had had the assistance of Mr. Gair and Mr. Waddington, the borough engineer of Marylebone, both of whom had done what they could to make the meeting a success.

THE PRESIDENT'S BEREAVEMENT.

On the motion of the chairman a vote of condolence was passed with the president, Mr. T. W. A. Hayward, in the loss which he recently sustained by the death of his son, Captain Kenneth A. Hayward—announced in THE SURVEYOR of the 29th ult.

THE HOLBORN COMMUNAL KITCHEN.

In his paper dealing with the above, Mr. Spurrell, the borough surveyor of Holborn, said the idea of a common kitchen in which people could eat or receive food at seemed at one time one which the general public would not entertain, it savouring, in their minds, too much of the soup kitchen associated with the poor; but the war had removed such prejudices as existed, and the public were recognising the value of such institutions, not only as a labour and food saving means, but as a place where good nourishing food, prepared under hygienic conditions, could be obtained at reasonable cost. The Coal Controller had published figures to show that the fuel necessary to cook for five persons in a private house could, in a communal kitchen, cook for fifteen persons. This alone should be an incentive to those in authority to establish these institutions, as "waste" in the past had been an unconsidered trifle. When in addition one got good food, the value of national kitchens would be appreciated, as without good, nourishing food one could not expect good heaelth, good work, and a reasonable output of work.

At the outset the Food Committee were faced with the difficulty of finding a place suitable for a kitchen which could cater for the people and at the same time be sufficiently large to make the undertaking self-supporting. Their choice eventually fell upon the swimming bath in Endell-street, one of the first baths to be opened in the Metropolis under the Baths and Wash-houses Act of 1846. The sunk swimming-bath measured 48 ft. by 38 ft., with an average depth of 6 ft. With the surrounding gangways and dressing-boxes (now removed) the extreme length was 70 ft. and the extreme width 55 ft., and it was this area—3,850 ft. superficial—which had been devoted to the kitchen.

The flooring over of the sunk bath was the first work undertaken, and this was carried out by the erection on the tiled floor of the bath of a timber construction, and boards to form the surface of the kitchen. These boards, fortunately, in view of the then high price of timber, were on the spot, as around the bath were dressing-boxes formed of $1\frac{1}{4}$-in. matching, which were taken down and used. It was important where there was waste water and grease that the floor should be jointless, and this could only be obtained by the use of linoleum or a composition flooring. The latter method was adopted, and Messrs. Turpin's material was used.

Many communal kitchens had failed in the past because they were badly designed or managed. The design of the working kitchen was, Mr. Spurrell submitted, a good one for the preparation of food and for prompt service, the latter a most important matter where the workers' time was limited. The "lay-out" of the kitchen was criticised at first, but it had since been recognised that the design is one which, taking into consideration the disadvantages of the site, could hardly be improved upon. The kitchen was entirely surrounded by other buildings, and had no external light or ventilation other than that obtained from the roof. It was open to the eye both in the preparation of the food and in the service. It was not hidden from view by screens or partitions, and the food was not prepared in a back room or in a basement. It had all the essentials that were necessary to make a communal kitchen a success. It was attractive, it was suitably equipped, the food was varied, fresh and good, the service was prompt, it was open at convenient hours, and the arrangements for payment were simple and convenient.

The kitchen being adjacent to the public wash-houses, where there was always an adequate supply of steam, it was decided to have steam fittings, and the larger portion of the food was cooked by means of steam. There were only two cooking-stoves. The fittings, which were supplied by Messrs. John Kelly & Sons, of Edinburgh, comprised six jacketed pans, two steamers, six Bain Maries, Hobart mincing machine, potato peeler, frying table, hot plate, steam kettle, gas oven, and sinks.

The pressure of steam was 15 lb. per square inch, and the hot water was received from the boilers in connection with the wash-houses at a temperature of 180 degrees.

The wastes from the several sinks were taken into iron pipes which discharged into one of the "Grant" grease traps which were in use in various works and hotels in the borough, and were found to be effective for intercepting fat and grease.

The kitchen accommodated about 200 diners at one time. The success of the kitchen was shown in the fact that whereas there was a loss during the early weeks of opening the average nett weekly profit for the past four weeks was £21, and so great was the public demand that it had been found necessary to throw into use for restaurant purposes the waiting-room which was used in connection with the slipper baths. At the present time the average number of portions sold daily within the building was 2,360, the daily average number of portions sold over the counter for outdoor consumption being 240.

The total cost of converting the bath into a kitchen, including the kitchen plant, utensils, crockery, cutlery, glass, &c., required, was £1,950. The staff employed at the kitchen numbers seventeen, and the regular weekly wage bill was £25 10s.

Concluding, Mr. Spurrell said it was his belief that the kitchen would become a permanent institution. Enquiries which he had made in the immediate neighbourhood showed that the small eating-house keeper had not suffered through the establishment of the kitchen, and one caterer went so far as to say that, instead of diminishing, his business had increased since the kitchen was opened!

DISCUSSION.

Mr. A. E. COLLINS (Norwich) said that in kitchens of this kind one generally found there was a difficulty in getting roasted joints served hot; in Holborn the arrangement seemed to be a good one. The only possible objection was that there was a certain amount of secondary cooking.

Mr. E. WILLIS (Chiswick) stated that in his district they had had to arrange for a number of distributing centres. They opened centres in the poorest class areas and found them total failures, yet centres in neighbourhoods where the rental of the houses was not less than £35 had proved a success. The real disadvantage of these kitchens was that there was too much of the minced material and too little of the meat in its natural form. A point which they had to consider was how long the kitchens were likely to be required, and whether it was not possible that, after spending large sums of money on

their provision, they were to be scrapped at the end of another year. Personally, he did not think the necessity for them would last more than another twelve months.

Mr. O. E. Winter (Hampstead) said his experience was similar to that of Mr. Willis—the greatest success had been achieved in the better-class parts of the district.

Mr. J. P. Waddington (Marylebone) stated that in his borough they had utilised one of the swimming baths. They fitted that up as a central kitchen, and had three subsidiary ones. He, too, had found that the best results were obtained in the better-class localities. There was now, however, a feeling that the necessity for these institutions would not exist in a few months' time, and preparations were being made to restore the swimming bath to its original use.

Mr. J. J. Kennan (Leamington) and the Chairman (Mr. G. W. Humphreys) also contributed to the discussion, the latter giving it as his opinion that the future of these kitchens depended not a little on the domestic servant question.

Mr. Spurrell, in reply, said the experience in Holborn was that all classes used the kitchen. But whether its present popularity would continue was a question he was unable to answer. They were pressed by the authorities to provide the kitchen, and although he claimed no credit for anything he had done, he was not unmindful of the fact that they had been able to run the kitchen at a profit when others showed a loss. Many kitchens had been closed, and he attributed that to want of proper management.

HOUSE REFUSE DISPOSAL AND SALVAGE.

Consideration was next given to a paper by Mr. James Gair, Assoc.M.Inst.C.E., highways engineer to the Marylebone Borough Council, entitled "Organising a Department for the Collection and Disposal of House Refuse during the War." The contribution will be found on another page of this issue.

Mr. J. P. Waddington (Marylebone) suggested that Mr. Gair had been too modest. He knew what dusting and slopping in a borough like Marylebone meant. The work was taken up in the middle of the war, at a time when labour troubles were great and likely to be greater, and like his confrères in other districts he had considerable doubts as to the wisdom of undertaking such work under the existing circumstances. His own view was that this kind of work was essentially one which should be in the hands of the local authority; but he had to say this, that in the whole of his forty years' experience he had never seen it done better than when it was being done in Marylebone by contract.

Mr. A. E. Collins (Norwich) inquired whether Mr. Gair had considered the use of rotary screens. He noticed that at present the screening was done on the flat, and the distribution of the refuse from the screen by hand labour.

Mr. O. E. Winter (Hampstead) remarked that destructors were regarded years ago as the best means of disposing of refuse; but we were now beginning to realise that it was a costly process. Hampstead was one of the first authorities in London to adopt one. Unfortunately it was two miles outside the district, and the cost of cartage became so serious that last year they stopped the working of the plant and sold it to a neighbouring factory, and he was now disposing of the refuse by sending it away to the country. But he had come to the conclusion that there was a considerable manurial value in house refuse, and it was in that direction that they could derive some economy by screening. He was now preparing a scheme for a plant such as the one described by Mr. Gair. The refuse, after screening, would be passed on to a travelling belt or table, where articles of value would be picked out, and the rest would be pulverised. He had already had offers of 1s. per ton loaded on trucks for the resulting material. He would like to know what was the total tonnage collected by Mr. Gair.

Mr. H. Shaw (Ilford) asked for more information as to how the cost of the Marylebone works was arrived at.

Mr. A. T. Gooseman (Blackburn) asked whether Mr. Gair had had any experience in stripping tins? He had been collecting tins and had been getting £8 per ton for them—about £20 if they were stripped and flattened out. Then as regarded rags, did Mr. Gair wash these or sell them dirty? Also what was the amount of cinders in the refuse?

Mr. C. Brownridge (Birkenhead) said there was no doubt we were going through a transition stage so far as destructors were concerned. The war had caused a great amount of economy to be exercised. It had raised the value of the articles they got at their destructors. After the war it was a question how far the present system of economy would be exercised. He was one who thought that to a certain extent they would go back to the bad old times. The consequence would be that their destructors—so called—instead of being destructors would be glorified marine depots. If they could do anything to get householders to exercise economy at the start and do a little salvage on their own account, that would be the first thing to be attained; but if the material was put into the dustbins and there was any value in it, it ought to be extracted. He considered the appliances at Marylebone were very excellent in showing how an existing structure could be adapted to this work of salving and saving. New works did not give the lessons many of them wanted; it was better to see a building that had been adapted and to see people who were struggling with difficulties and getting good results. He would offer only one suggestion with regard to the Marylebone works, and that was that Mr. Gair might be able to effect an improvement on the present arrangement of picking over the refuse on its arrival; it did not strike him as altogether sanitary for men to be engaged on such work. The suggestion about washing the coke breeze was most excellent. Concluding, Mr. Brownridge expressed the hope that it might be possible on some future date to pay another visit to the works.

Mr. Gair, in replying upon the discussion, pointed out that the plant was of a very antiquated description. They did not claim to have done anything of an original nature, but had done the best with the means at hand. The tipping grating was there when they took over the premises, and he admitted it was not the best way of handling the refuse. His idea would be not to have it at all if they were to have an up-to-date plant. What was really required was a pit for the reception of the refuse and some mechanical means of picking up the material and putting it on to the screen. That would do away with the labour of about ten men. They could pick off the belt what was of marketable value. He had had no experience of a rotary screen. He had gone into it and decided against it, his view being that it was not a sound idea. As to the manurial value of the refuse he had had a chemical analysis taken, and the result showed that the material was about comparable with ordinary horse manure. That, however, was rather misleading. Dust varied at different times of the year, and he did not think that at certain periods the manurial value was very high. The idea of the screening method was to eliminate from the dust what was really of no manurial value. It was no use grinding up articles of crockery and trying to sell that as manure. He went into the question of washing or steaming the rags, but he decided that, having regard to the price obtained and the labour involved in washing, it would be better to sell them as they came out of the dust. Likewise the paper was so dusty that sorting would not have paid. The percentage of cinders varied very much; from experiments he had made he found that in the month of January it was about 33 per cent, falling to a practically negligible amount in the summer. With reference to salvage in general, it was the co-operation of the householder they wanted to obtain. It was at the source where the sorting ought to be done. If they could get every householder to keep separate the organic from the inorganic matter it would render the operations at the works very light. He had tried cutting up the tins. He had been offered £15 per ton for tins 15 in. by 9 in., but found that owing to the cost of labour it did not pay.

LOCAL AUTHORITIES AND HOUSING.

HOUSING AND ROADS.

Dealing with the subject of roads, a sub-committee of the Reconstruction Committee, appointed to report on the housing question, makes the following proposals:—

With the distribution of population resulting from the density of building recommended above, carriageways and footways narrower in width than usually adopted in urban areas will be adequate, and should be used for roads not required to carry through traffic.

Great care should be taken to secure economy and convenience in the lay-out plan:—

(1) By providing direct routes of easy gradient for main thoroughfares.

(2) By planning the minor roads mainly to afford the best building frontages and so as not to attract through traffic.

(3) By distributing the different types of houses on roads which afford the best aspect for each type.

(4) By avoiding unnecessary waste of frontage and road junctions.

Minor roads should be constructed in a less costly manner than thoroughfares, economies being effected in the following lines:—

(1) By reducing the width of carriageways and paved surfaces on footways.

(2) By adopting a thickness and character of construction appropriate to the anticipated traffic.

(3) By the use of suitable clinker from refuse destructors, when available, either as rubble for foundations or in the form of a layer of concrete where expedient.

(4) By adopting lighter or less costly, or by omitting, kerbing and channelling.

Wath-on-Dearne Urban Council are acquiring 42 acres of land for housing purposes, and contemplate a scheme costing from £150,000 to £200,000.

PUBLIC SERVICE MOTOR VEHICLES.

STREET CLEANSING AND GULLY EMPTYING MACHINES.

A demonstration of street cleansing and gully emptying was a noteworthy attraction at last Friday's meeting of the Institution of Municipal and County Engineers in the metropolitan borough of Holborn, Straker-Squire, Laffly and "Pioneer" machines being among the vehicles taking part in the operations. Two Straker-Squire vehicles, which are illustrated herewith, were lent for the occasion by the authorities of Marylebone, one being a combined washing and squeegeeing machine and the other a vacuum gully emptier. In order to permit of the washer demonstrating its powers, the road surface in Bedford-place and adjoining thoroughfares was

Straker-Squire Street Washer.

strewn with refuse, which was quickly and effectively dealt with; and a number of gullies were emptied with equal expedition—and what is more important, entire absence of nuisance—by the other machine.

Some idea of what the Straker-Squire washer is capable of may be obtained when it is stated that with all its three power spraying nozzles going, a length of no less than 2 miles can be covered on an eleven-hundred-gallon filling of the water tank. In changeable weather the use of all three sprayers will as a rule be found necessary, and in wet weather they can be partially closed, and the quantity of water used reduced by as much as one half. On macadam roads, where the use of the power spray is impossible, and only gravity sprinkling admissible, a single filling of the tank will be found to last practically double the time.

In the Straker-Squire gully-emptying machine a circular tank of 850 gallons capacity serves as the container for the liquid and solid matter extracted from the gullies. The

Straker-Squire Gully-Emptying Machine.

emptying of a gully is effected by a suction tube supported by a light jib fitted with a hand winch, a quick-acting shut-off valve being provided at the entrance of the suction pipe to the vacuum tank. The vacuum is maintained by an air pump driven by the motor, which can be thrown in and out of gear as required. An automatic valve is provided in the tank to prevent water being drawn over into the cylinders of the vacuum pump. A large door with a quick-opening swing catch is provided at the rear of the tank for discharging solid and liquid matter, this door being of such a size that a very complete discharge is effected. Not only did last Friday's demonstration prove that the vacuum system of gully emptying is vastly superior from an hygienic standpoint to the old-fashioned methods of hand ladles and scoops, but that a very real economy in labour costs is made possible by the use of a machine which, owing to its speed and ease of control, reduces to a minimum the time spent in running to the depots to discharge.

The "Pioneer" sweeping and loading machine which the members of the institution had also an opportunity of seeing at work, was one that has been in successful use at Birmingham for some time past. It appears that the Holborn Borough Council made a trial a few years ago of a vacuum loader. This was found to possess many advantages, but a disadvantage attaching to its use was that as the machine and the receptacle for the refuse was built on one body, the machine was obliged to stand idle while the receptacle was being emptied at the depot. In the "Pioneer" machine this difficulty is overcome; the receptacle for the refuse which it collects is the motor lorry to which it is attached, and this as soon as full can be quickly detached and its place taken by another vehicle, the result being that the process of cleansing goes on practically without interruption.

REPAIRS AND SPARE PARTS.

The Priority Department of the Ministry of Munitions has intimated to manufacturers of motor vehicles that they can now carry out repairs to, and supply spare parts for, vehicles of their own make without restriction as to the value of the repair work and without the necessity for being furnished with a priority permit either for such work or for spare parts supplied. For the time being, however, orders accompanied by a permit will take precedence of other orders. The supply of sparking plugs also is now sanctioned free of permit.

BENZOL AS FUEL.

The Board of Trade state that considerable quantities of benzol are now available for use as motor fuel. The ordinary motor spirit licences can be used for its purchase, but after January 1st the Petrol Control Department will issue special supplementary licences available for the purchase of benzol only. Further information may be obtained from the Controller, Petrol Control Department, 19 Berkeley-street, London, W. 1.

Cork Guardians are considering the question of purchasing an additional motor ambulance.

Chester-le-Street Rural District Council have agreed to purchase an additional motor wagon.

LAW QUERIES AND REPLIES.

Edited by J. B. Reignier Conder,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as **noms de plume**. *The letter* **X**, *combinations such as* **X.Y.Z.**, *and words such as "* **engineer**" *and "* **surveyor**," *should never be used.*

Public Well: Powers of Rural District Council.—"P. W." writes: In a village in this (rural) district there is a well in a field, from which the occupiers of houses in the village have been accustomed for many years to obtain water for use for domestic purposes. The field adjoins a public highway, and there is a footpath from the entrance gate leading to the well. During the last few years the population of the village has considerably increased, and with a view to facilitate the use of the well and also to guard against the risk of pollution, the council propose to cover it in, and fix a hand pump for pumping up the water. Will you kindly advise me whether they can legally do so without the consent of the owner of the field?

Assuming that the well has been used continuously by the inhabitants of the village for the supply of water for domestic purposes, without payment, for twenty years and upwards, it is, in my opinion, a public well, vested in and under the control of the rural district council, under sec. 64 of the Public Health Act, 1875, and they have power to do what is proposed, without the consent of the owner of the field. See *Smith* v. *Archibald* ([1880] 5 App. Cas., 489).

Erratum.—In the note of the case of *Levet* v. *Gas Light and Coke Company*, at p. 268 *ante*, in line 25, for "excess" read "access."

Street-lighting Economies.—As regards street lighting this winter, Sheringham, Norfolk, Urban District Council have agreed to light lamps at the top and bottom of each street in the town. Under future contracts with the gas company no lamps will be lit in May, June, and July, and in the other months they will not be lit for the six nights of the full moon.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Poole R.D.C.—The council have referred to the building inspector a letter suggesting some relaxation in the Model Building by-laws. It was pointed out in the communication in question that there would most probably be many huts available from the different camps, and which would be procurable elsewhere on reasonable terms. If the material from these huts were used, good, substantial, commodious, dry and healthy houses could be erected without being a source of danger to health or from fire. Picturesque and good houses could be built without any danger of a slum area arising.

York T.C.—It is proposed to convert certain wool-sheds into a public slaughterhouse, and the city council are asking for sanction to spend £500 upon the necessary machinery.

REFUSE COLLECTION AND DISPOSAL.

Lurgan U.D.C.—Dr. Stephenson, medical inspector to the Local Government Board, reporting on the sanitary conditions prevailing in the district, stated that the sanitary authority undertake the domestic scavenging of the recently built artisans' dwellings (thirty-four in number) in Wellington-street, but in other parts of the urban district the removal of refuse devolves on the occupiers and owners. The sanitary authorities would be well advised, he adds, in undertaking the domestic scavenging of the entire urban district. The question of domestic scavenging was referred to the Streets Committee.

Merthyr T.C.—The Public Works Committee recommend the provision of a refuse destructor, on a site to be agreed upon at a future date.

ROADS AND MATERIALS.

Bedford T.C.—A committee have submitted plans of an improvement at Midland-road and Preband-street, estimated to cost £325.

Brighton T.C.—The Tramways Committee have instructed the engineer to put in hand at the earliest possible moment all repairs to the permanent way for which materials can be obtained.

Devon C.C.—The council propose to effect a deviation of the main road between Ilfracombe and Combemartin, necessary in consequence of a subsidence, at an estimated cost of £1,490.

Filey U.D.C.—The council have referred to the General Purposes and Plans Committee a communication from the Road Control Board, drawing attention to the fact that on demobilisation more labour would be available for working the stone quarries, and that there would thus be a bigger supply of stone for the roads. It was suggested that highway authorities should prepare proposals for absorbing the full output of the quarries. The council were asked to communicate the amount of stone it was estimated to use in the year 1914-15, which would be a guide as to the amount now required.

Hastings T.C.—The town council have authorised the Improvements Committee to proceed with the completion of the White Rock improvement.

Hendon U.D.C.—It is proposed to purchase land for the formation of a rural walk and pleasure ground by the banks of the river Brent.

Kildare C.C.—The county surveyor, Mr. John Rorke, reports that the Road Board have written consenting to allocate a grant of £620 towards an expenditure of £1,420 for the work of resurfacing the road between Athy Urban boundary and Queen's County boundary near Ballylinan, damaged by extraordinary traffic.—It has been agreed to increase the petrol allowance to the assistant surveyors for the purpose of their motors from £17 to £25 a year.

Maidstone T.C.—The council have approved the plans of the borough surveyor, Mr. T. L. Bunting, for the widening of Tonbridge-road at High Cross.

Sherburn R.D.C.—Upon the suggestion of the surveyor, Mr. W. Plewes, the council have agreed to raise the price for carting to 10s per day for a single horse and cart, 14s. for two horses, and 17s. for three horses.

WATER, GAS, AND ELECTRICITY.

Barrow-in-Furness T.C.—Certain extensions of the electricity business will necessitate the provision of additional switch gear and transformers at an estimated cost of £1,500.

Belfast T.C.—It was reported that the plans for the new generating station were nearly completed. The appointment of a quantity surveyor had been decided on, and the Electricity Committee expect to be in a position to invite tenders for the erection of the buildings at an early date.

Cheadle R.D.C.—The medical officer of health recommends the council to provide a water supply for seven villages in the rural area.

Coleraine R.D.C.—Mr. W. J. Given, engineer, has submitted a report and plans for a water supply scheme. The estimated cost was stated to be £2,261, but it was explained that if Sir Henry Bruce did not supply the distributing pipes to Castlerock the total expenditure might reach £4,000. The council have asked the Local Government Board to fix the area of charge for the proposed outlay.

Dolgelly U.D.C.—The council have formed themselves into a committee for the promotion of the electric lighting scheme.

Epsom U.D.C.—The question is being considered of closing the electricity works and purchasing electricity in bulk.

Greetland U.D.C.—The council are considering a scheme for providing electricity for street lighting and other purposes.

Horsham U.D.C.—The Waterworks and Lighting Committee reported that the company whose tender of £620 19s. for motor plant had been accepted, wrote that, owing to increased factory costs, they were only able to do the work at an increased price of £42 5s. These terms were accepted.

Huddersfield T.C.—The town clerk has been instructed to prepare and submit a Bill in Parliament providing for the acquisition by the corporation of the works of two local gas companies, the Longwood and Slaithwaite Gas Company and the Kirkheaton, Dalton, and Lepton Gas Company.

Hull T.C.—The water engineer reported to the Water Committee that last week the water was so low at Springhead and Cottingham that it was thought advisable to cut off the supply to some parts of the city, but that so far that had been avoided. Before the war the consumption was 11 million gallons per day; and there had been a great increase during the war. He believed that a good deal of waste was due to the difficulty of getting repairs done promptly, and the use of unsatisfactory washers. If the Dunswell works had gone on the city would have been in a much better position, but they were stopped by the war. Another element was the shortage of rain. The water engineer was instructed to make an appeal to the public to avoid waste.

Islington B.C.—The extension scheme in connection with the electricity undertaking is now estimated to cost £125,000, compared with an estimate of £53,000 in 1917.

Loughborough T.C.—The Electricity Committee have decided to instal a new Babcock and Wilcox boiler at an estimated cost of £5,000.

Westmorland C.C.—It was stated at the last meeting that the Manchester scheme to take water from Haweswater Lake would do away with one of the county bridges and about 2 miles of district road between Long Sleddale and Mardale, which Manchester proposed to make into a bridle path.

Worthing T.C.—The town council are considering a proposal for the extension of the electricity plant.

MISCELLANEOUS.

Colchester T.C.—The town council have approved a scheme for the improvement of the river Colne. The scheme proposed provides for the widening and deepening, with a slight straightening, of the navigable section of the Colne from the Hythe to a short distance beyond Alresford Creek, and the enlargement of the swinging dock for turning vessels up to a diameter of about 250 ft. The borough surveyor, Mr. H. Collins, estimated the cost at about £104,000, but this may be increased to about £120,000.

Exeter T.C.—A special committee have submitted a proposal for establishing two national kitchens, and recommend that the Treasury be asked for a loan of £1,000 to cover the cost.

N.A.L.G.O.: A Hereford Branch.—A well-attended meeting was held at the Shire Hall, Hereford, on Tuesday last, when it was unanimously decided to form a local branch of the National Association of Local Government Officers, including all officers serving local government departments in the administrative county of Hereford. It was decided to elect the county surveyor, Mr. G. H. Jack, M.INST.C.E., as first president; Mr. E. S. Richards, of the education department of the county council, as secretary; and Mr. J. Birch, accountant to the Hereford City Council, as treasurer. A representative committee was also elected for the purpose of drafting the rules and drawing up a programme for the ensuing session.

PERSONAL.

Mr. W. J. Steele, city engineer of Newcastle-upon-Tyne, has had his salary increased to £1,300 a year.

Mr. J. Anstee, surveyor to the Guildford Rural District Council, has been voted a bonus of £25 for the year ending March 31st next.

Messrs. W. N. Hoskins and M. J. McMaking, city engineer's department, Cape Town, have been elected associate members of the Institution of Civil Engineers.

Mr. R. H. Dorman, county surveyor of Armagh, has intimated to the county council that he intends to retire early next year. He has been over 40 years in the public service.

Mr. C. K. Henderson, of Bristol, who served in the war, has been appointed to the joint offices of surveyor and sanitary inspector to the Bulkington Urban District Council and the Nuneaton Rural District Council, in succession to the late Mr. H. W. Wilson.

Mr. Fred J. Dixon, engineer to the Staffordshire Water Company, has appointed Mr. A. H. Rofe, water superintendent to the Oswestry Town Council, as superintendent for the Sutton Coldfield portion of the company's area. Mr. Rofe will commence his duties on January 1st.

Colonel Longdin, surveyor to the Penge Urban District Council, received a warm welcome from the members at the last meeting of the council on his return from active service. The chairman, Captain Marr, said they congratulated Colonel Longdin in the name of the whole district upon his accomplishments in France and Italy in connection with road repair and road making. Captain Marr added that in Italy the authorities were so satisfied with Colonel Longdin's work that they named an avenue after him.

Messrs. T. J. Binnie (assistant engineering inspector, Road Board), J. B. Collins (assistant county surveyor, Galway), C. W. B. Daman (city surveyor's office, Birmingham, on active service), D. J. Diver (surveyor, Marple Urban District Council), D. B. Elliott (assistant county surveyor, Antrim), F. Ivinson (district surveyor's office, Whitehaven, on active service), M. Kirby (assistant county surveyor, Cavan), A. Suttel (acting surveyor, Wetherby Rural District Council), and W. G. Whisstock (surveyor, Woodbridge Urban District Council), have been elected members of the Institution of Municipal Engineers. Mr. G. C. Crowther, assistant engineer, Witham and Black Sluice Drainage and Navigation Commissioners (on active service), has been transferred to membership of the same body.

OBITUARY.

CORPORAL A. H. BRADLEY.

We regret to report that Corporal Arthur Hubert Bradley, elder son of Mr. Arthur W. Bradley, M.INST.C.E., borough and water engineer, St. Helens, died in hospital from bronchopneumonia on the 2nd inst., and was interred in the Military Cemetery, Etaples, France. On the outbreak of war Corporal Bradley joined the West Lancashire Divisional Royal Engineers Signal Company, and was in France from February, 1917, with the 57th Division Signal Company, Royal Engineers, until May 11th, 1918, when he was badly gassed. He was three months in hospital, returned to France on November 4th last, and was admitted to hospital at Etaples on November 10th suffering from pneumonia. Nothing definite is known of the fate of Mr. Bradley's younger son George Alan Bradley, 20th Battalion (University and Public Schools) Royal Fusiliers, who was reported "missing" after the attack upon High Wood, France, on July 20th, 1916. Corporal Bradley would have been twenty-four years of age on March 28th next, and his brother would have been twenty-two on the same day. Both boys were educated at the Bury Grammar School and Liverpool College. Previous to joining the Army the elder son was articled to his father, and the younger son was a law student at the Liverpool University.

Institution of Civil Engineers.—The discussion of the three papers on road questions presented at the last meeting of the Institution of Civil Engineers has been fixed for Tuesday next, the 17th inst., at 5.30 p.m.

"Safety First" Propaganda.—At the last meeting of the London "Safety First" Council it was reported that arrangements are being made to hold local propaganda meetings in the Greater London area during the ensuing winter and spring.

FOR OTHER ADVERTISEMENTS

See End of Paper.

WANTED IMMEDIATELY, an expert Land Surveyor's Draughtsman for revision of 6-in. Ordnance map. Salary, 5 guineas per week. Engagement for one month.—State experience to J. Henry Taylor, Borough Surveyor, Barnsley. (3,962)

ENGLISH FIRM of ENGINEERS, with London Office, Works and Stores 15 miles out, and highly-trained technical and travelling staff, desire Sole Representation of Manufacturers of Plant or Specialities of interest to Municipal and Electricity Undertakings, Gas Works, Mills, Factories, Breweries and Power Users generally. Unique personal connection and goodwill in the United Kingdom, the Continent of Europe and the Colonies.—Verax, c/o Pottle's, Royal Exchange, E.C. 3. (3,961)

URBAN DISTRICT OF RHYL.

The Rhyl Council are prepared to receive applications for the position of Road Foreman. Wages, 40s. per week, plus 10s. per week War Bonus.

Applications, endorsed "Foreman," stating age, experience in public work and in the management and control of horses and workmen, to be sent to the undersigned not later than the 21st inst.

Applications to be accompanied by not more than three recent testimonials.

ARTHUR A. GOODALL,
Town Surveyor.

Council Offices, Rhyl.
December 10, 1918. (3,963)

CITY OF BIRMINGHAM.

Applications are invited for the position of Temporary Surveying and Architectural Draughtsman for the Housing and Town Planning Department.

Candidates must have had previous experience in the laying-out of large estates, being accurate and expeditious levellers and surveyors, and good draughtsmen. Salary £3 10s. per week.

Applications, stating age, experience, present employment, and accompanied by three recent testimonials, should reach me without delay.

HENRY E. STILGOE, M.INST.C.E.,
Engineer and Surveyor.

Council House,
Birmingham. (3,965)

EAST HAM CORPORATION.

The Corporation is prepared to receive applications for the appointment in the Engineer's Department of an Architectural Assistant at a weekly salary of 3 guineas, plus £1 5s. per week War Bonus.

Applicants must have had an all-round experience. Applications, in candidate's own handwriting, stating age, qualifications and previous experience, to be delivered addressed to Mr. J. Birch, Borough Engineer, Town Hall, East Ham, E. 6, not later than December 30th, 1918.

Canvassing the Members either directly or indirectly is strictly prohibited and will disqualify.

(By order)
C. EUSTACE WILSON,
Town Clerk.

Town Hall,
East Ham, E. 6.
December 11, 1918. (3,966)

HERTFORDSHIRE COUNTY COUNCIL.
TENDERS FOR GRANITE, SLAG AND TAR-MACADAM.

Tenders are invited for the supply of Broken Granite, Slag and Tar-Macadam, required for the main roads during the year ending March 31st, 1920. Forms of Tender and Conditions of Contract may be obtained on application at my office, or will be sent through the post upon receipt of a stamped addressed foolscap envelope. Tenders, which must be on the forms provided, are to be delivered not later than January 15th, 1919. The lowest or any Tender will not necessarily be accepted.

J. S. KILLICK, M.INST.C.E.,
County Surveyor.

County Surveyor's Office,
Hatfield.
December 9, 1918. (3,967)

COMPETITION.

CITY OF BIRMINGHAM.

The Housing and Town Planning Committee invite Surveyors, Architects and others to submit Designs for Laying out an Estate of 54 acres, together with Designs for Houses at Pineapple Farm and Fordhouse Farm, King's Heath and Stirchley.

Premiums of £150, £100 and £50 respectively will be awarded to the designs adjudged to be first, second and third in the order of merit.

The premiated designs will become the property of the Corporation.

Particulars may be obtained on or after the 1st January, 1919, on application to the Town Clerk, Council House, Birmingham.

Applications are to be accompanied by a deposit of 10s., which will be refunded on receipt of a design, or the return of the particulars within 14 days. (3,964)

ASSOCIATION OF MANAGERS OF SEWAGE DISPOSAL WORKS.

ANNUAL MEETING AND DINNER.

There was a large gathering of members and visitors at the Holborn Restaurant on Thursday, the 5th inst., when the Association of Managers of Sewage Disposal Works held their seventeenth annual general meeting and dinner. The chair at both functions was taken by Mr. J. Edward Willcox, M.INST.C.E., president, and the attendance included Dr. Bostock Hill, Dr. S. Rideal, Capt. Speight, Alderman Chantler, Alderman Moston, Alderman Thorpe, Alderman Berry, Alderman James, Alderman Lawrence, Alderman Inman and Messrs. J. D. Watson, E. Ardern, C. Percy Williams, D. Balfour, J. H. Blizard, W. Makepeace, G. Hart, C. H. Ball, H. Edwards, C. Griffiths, Scott Murray, W. H. Mayes, T. Barlow, J. H. Edmondson, C. A. Snook, T. Chittle, J. H. Garner, A. Reynolds, J. Bolton, W. L. Strachan, J. Craig, G. Fowler, S. Guy, C. H. Hamlin, J. Hamlin, C. G. Girling, J. H. Barford, F. T. Hambleton, E. J. Quiek, R. Tyson, J. Custance, S. Green, A. Eade, H. Dyson, H. Hiett, E. Linden, J. E. Farmer, C. E. Watkins, J. Brown, H. Smith, W. H. Duckworth, T. Hughes, S. Flinn, J. Taylor, A. Stone, W. Tomlinson, W. C. Smith, R. H. S. Higgins, G. J. Rich, A. B. Coombes, and J. B. Croll (hon. secretary).

The PRESIDENT, in opening the proceedings, said they all felt a deep sense of relief at the cessation of hostilities, and they also rejoiced at the splendid series of victories which had brought them within measurable distance of what, it was to be hoped, would prove a prosperous and lasting peace. He congratulated the members upon meeting under happier auspices than had been possible during the last four years, and that in future they would be able to continue their work under improved conditions.

The HON. SECRETARY, having read letters of apology for non-attendance from Messrs. A. J. Martin and E. G. Mawbey (Leicester), proceeded to read the minutes of the last meeting, which were duly confirmed.

THE PRESIDENT RE-ELECTED.

The hon. secretary stated that Mr. Willcox had kindly consented to accept the office of president for another twelve months. Mr. Croll made reference to the untiring energy of that gentleman, and intimated that the association could not better appreciate his work than by inviting him to occupy the presidential office during peace year.

The PRESIDENT, in reply, said he appreciated very much the compliment that had been paid to him. He hoped to be able to do his utmost for the furtherance of the association's interests, but of course in such a year as was before them he personally would be confronted with very busy times, not only in his own work, but in all kinds of public duty which required attention. He would endeavour to attend as many meetings as he possibly could, and do everything in his power for the association.

COUNCIL'S REPORT.

In the report of the council, which was adopted, it was stated, *inter alia*, that the membership had undergone little change, the total number on the roll being 340. There had been an increase in the number of papers contributed and large attendances at the various meetings. The financial statement continued to be very satisfactory.

The report of the delegates to the N.A.L.G.O. conference at Blackpool recorded that a resolution had been adopted recommending a superannuation scheme upon a non-contributory basis.

COMPETITIVE ESSAYS.

The President then announced the result of the competitive essay scheme introduced last year on the subject of the utilisation of sludge. Four papers were received, and the largest number of marks were given to that of Mr. F. T. Hambleton, Newcastle-under-Lyme, the second premium of two guineas going to the paper of Mr. C. A. Snook. He (the president) had had the opportunity of reading the papers and could say that they were of great interest and value, and would be of considerable service to the members of the association. He heartily congratulated the competitors upon these papers.

PAPERS.

Papers were then read by Mr. John H. Garner (sewage disposal works, Huddersfield) on "The Utilisation and Disposal of Sludge," and Mr. F. T. Hambleton (sewage disposal works, Newcastle-under-Lyme) on "The Disposal of Sludge," the latter being the premiated essay in connection with the scheme of competitive papers recently inaugurated.

THE DINNER: PRESENTATION TO THE HON. SECRETARY.

The dinner, which was held in the evening, was marked by an interesting and gratifying incident—viz., the presentation of a well-deserved testimonial subscribed by the members to the popular hon. secretary, Mr. J. B. Croll. The president again took the chair.

Following the toasts of "The King" and "His Majesty's Forces," Mr. E. J. Silcock submitted "The President," expressing the gratitude of the members at Mr. Willcox having consented to accept the office for a second term.

Mr. WILLCOX, in reply, said he had had some diffidence in accepting the honour for another year, but the council very kindly said they would render him all the assistance they could, and forego a presidential address, because situated as he was—being engaged on Government service—he might probably be unable to find time to prepare one. His year of office had been a very pleasurable one, and one also of valuable experience to him, inasmuch as it had given him the opportunity of conferring with those who had been engaged in the placing and construction of schemes of sewage disposal. After the conclusion of peace, sewage managers would be confronted with questions and problems which would require very thoughtful consideration, and they would have a conspicuous part to play in connection with the work of national reconstruction. In that connection he would like to say that they must not undervalue the importance of scientific research and investigation, seeing that it was only by such aid that they could be enabled to take prompt and full advantage of the various developments of sewage disposal so important to the country at large. Such an association as this depended upon the co-operation of its members, and it was desirable that those who were engaged in research work should communicate their experiences to others not so fortunately placed.

The PRESIDENT, in making a presentation of a gold watch and chain, subscribed by the members, to the hon. secretary, Mr. J. B. Croll, stated that that gentleman had rendered very valuable help to the association by his untiring services during a succession of years. Mr. Croll was instrumental in establishing the association, and had also been not only secretary, but the librarian since 1904, and there could be no doubt that it was largely to his work in various directions that the success of the association was due. He had some knowledge of the organising ability of Mr. Croll, his tact and courtesy, and it was in recognition of these qualities that the members asked that gentleman to accept this testimonial, with every wish for his future happiness and prosperity.

Mr. REYNOLDS, late chairman of the council, added his testimony to the ability and assidnity with which Mr. Croll had discharged his onerous duties.

Mr. CROLL, in accepting and acknowledging the gift, said he would value it not so much for its intrinsic worth as for the proof it afforded that he had made friends among them, and that they sincerely appreciated the services he had been able to discharge as hon. secretary of the association. The office was certainly no sinecure, but he could say that he took up the duty knowing it would mean a great deal of work. He felt he had been encouraged and repaid by the useful services which the association had done in improving the status of sewage works managers. It had been the means of inducing the manager to take a great deal more interest in his work than he formerly did, and it was to be hoped that many more would see the advantage of becoming members, for while they could not gain anything by being outside, they would gain much by being inside. He trusted it would not be long before the certificate of the association became the key to the position of sewage works manager.

Mr. J. D. WATSON next proposed "The Association," and remarked that sewage works managers had had an exceptionally arduous time during the past four years. Their staffs had been depleted, and there had been great difficulty in obtaining materials, while there had been still greater difficulty in obtaining the implements and plant to carry on the necessary work. Yet, in spite of all these drawbacks, he knew as a fact that most of the works had gone on practically as if nothing had happened to hamper them. That result had been achieved by the greatest possible effort and by the concentrated direction of the managers, and so much had this quality been in evidence that he was certain that no country in Europe had during the last four years fulfilled the duty of purifying the streams with greater success than this country. They might depend upon it that much more would be done in the future than had been done in the past, so much so that it would be a real privilege to live in these times. Many of them had suffered, and many were likely to suffer for a considerable time to come in consequence of the war, but he trusted that the re-creation of England, or rather the rejuvenation of the nation, would bring its reward, and something even greater than that—a better condition of the rivers of the country. He trusted that they would all do their level best to bring this about, and that the association would, as a body, do everything possible to prove to the public generally that England could not be what it ought to be if all the streams were allowed to run filthy water. They knew that streams could be purified and kept in decent order if the money and plant were available for the work, and with unity of purpose they could stimulate each other, not only in improving their respective works, but also be zealous in improving the stream into which their effluents were poured. He

thought that they should keep their weekly records so that they could be more comparable than was the case at present. They had variations, as that between Sheffield and Birmingham for example, which need not obtain at all, and although it might mean the expenditure of more money to secure the remedy, this should be found, as it was national work, and indeed necessary to the world at large. To obtain this it was necessary to have a central co-ordinating authority, and also a research department connected with the Government, so that sewage works managers could obtain information which would be useful to them individually, and that direct help which would enable them to do better work than they had hitherto been able to do.

Mr. J. BOLTON (chairman of the council), who replied, observed that while schemes had been held up during the past four years scientific research had progressed, and he thought that sewage problems had never been in such an advanced position as they were at present.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

SURVEYOR.—December 14th.—Hunsworth Urban District Council. £150 a year.—Mr. J. S. Claricoat, 14 Piccadilly, Bradford.

SURVEYOR AND INSPECTOR.—December 16th.—Rawdon Urban District Council. £170 a year.—Mr. H. Walmsley, clerk, Council Offices, Rawdon, Yorks.

ARCHITECT.—December 16th.—East Retford Town Council.—Mr. W. Percival Jones, town clerk, East Retford, Notts.

ARCHITECTURAL ASSISTANT AND SURVEYOR.—December 17th.—Rotherham Town Council. Two architectural assistants at £300 and £250 per annum, and a surveyor at £250 per annum.—The Town Clerk, Town Hall, Rotherham.

ROAD FOREMAN.—December 21st.—Rhyl Urban District Council. 40s. per week, plus 10s. war bonus.—Mr. A. A. Goodall, surveyor.

ENGINEERING ASSISTANT.—December 21st.—Litherland Urban District Council.—Mr. William H. Elce, engineer and Surveyor, Council Offices, Litherland, Lancs.

TEMPORARY ARCHITECTURAL ASSISTANT.—December 21st.—Blyth Urban District Council. £4 per week.—Mr. Leonard Leeper, engineer and surveyor, Council Offices, Blyth, Northumberland.

JUNIOR ASSISTANT.—December 31st.—Dover Town Council. £150 a year.—Mr. W. C. Hawke, borough engineer, Maison Dieu House, Dover.

ASSISTANT SANITARY INSPECTOR.—December 31st.—West Bromwich Town Council. £150 a year.—Mr. A. Wickham, town clerk, Town Hall, West Bromwich.

ARCHITECT.—January 6th.—Aberdare Urban District Council. £459 a year.—Mr. W. R. Morgan, clerk, Town Hall, Aberdare.

SURVEYOR.—January 31st.—Romford Urban District Council. £335 a year, with war bonus of £35.—Mr. Charles T. King, clerk, Council Offices, Romford, Essex.

STEAM ROLLER DRIVER.—Marsden Urban District Council.—Mr. F. Greenwood, surveyor, Gasworks, Marsden, Yorks.

STEAM ROLLER DRIVER.—Aylesbury Rural District Council.—Mr. R. T. Stewart, surveyor, 21 Walton-street, Aylesbury.

ENGINEERING ASSISTANT.—Luton Town Council.—Mr. J. W. Tomlinson, borough engineer, Town Hall, Luton.

LAND SURVEYOR'S DRAUGHTSMAN (month's engagement).—Barnsley Town Council. £5 5s. weekly.—Mr. J. H. Taylor, borough surveyor.

MUNICIPAL CONTRACTS OPEN.

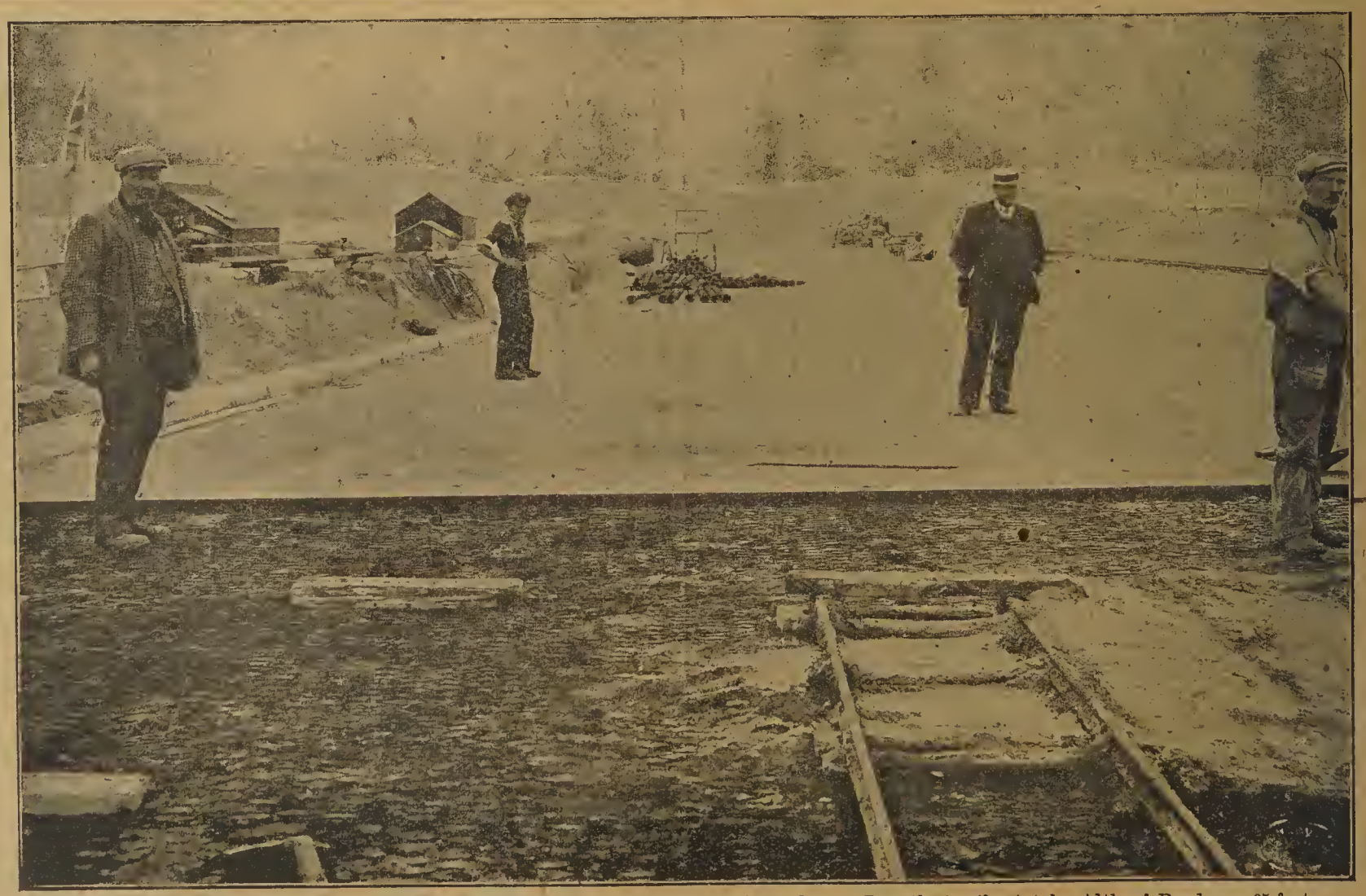
OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

MERTHYR.—December 31st.—For the completion of fourteen houses.—The Borough Architect, Town Hall, Merthyr Tydfil.

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH
EXPANDED METAL.



EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length 1 mile; total width of Roadway, 65 feet.
Mr. SAMUEL HUTTON, Urban District Council Engineer and Surveyor.

THE EXPANDED METAL COMPANY, LIMITED
(Patentees and Manufacturers of Expanded Metal).
Head Office: YORK MANSION, YORK ST., WESTMINSTER, LONDON, S.W. 1.
Works: STRANTON WORKS, WEST HARTLEPOOL.

The Surveyor

And Municipal and County Engineer.

Vol. LIV. DECEMBER 20, 1918. No. 1,405.

Minutes of Proceedings.

By-law Reform (I.)

Now that the Departmental Committee appointed in 1914 by Mr. Herbert Samuel, the then President of the Local Government Board, have issued their report, there is reason to hope that the controversy that has raged around this subject during the past few years may in the near future be terminated by appropriate legislation. In another column will be found a brief summary of the report, which is a lengthy document, every page of which is well worth perusal and study. We regret that considerations of space prevent us from reproducing it *in extenso*, but we hope to deal with its various sections by way of comment in this place during the next few weeks. In pursuance of this plan, we shall confine ourselves at the moment to the first chapter of the report, which deals with the present legal system. We are glad to observe, in the first place, that the committee do not suggest any change in the policy by which the construction of streets and buildings is controlled by by-laws of general application throughout a district. In recent years there has been a distinct tendency to belittle the effect of by-laws in securing buildings of sound and healthy construction, and there has been a persistent cry for "elasticity." Far from sympathising with this attitude, the committee suggest the consolidation of existing statutory provisions with the addition of any powers which might suitably be exercised by all authorities and a general widening of the scope of the by-law making power on the lines indicated in the report. It is true that they make drastic recommendations with regard to the modernising of absolete sets of by-laws; but this is a plan which in our view has many advantages over any form of "elasticity." The committee further suggest the abolition of the present distinction between various classes of local authorities as regards their power to make by-laws. In view of the fact that any proposed by-laws must receive the confirmation of the Local Government Board, this distinction certainly seems unnecessary, as the board naturally consider the needs of the particular district in deciding whether to give or withhold their sanction. The report also deals with the anomalies arising from the existing statutory definitions of a "new building," and comments at some length on the recent case of *Repton School Governors* v. *Repton Rural District Council*, which has already been noted in these columns. This is a subject which has caused great technical difficulty in the past, and we agree that an amendment of existing statutory definitions is urgently necessary.

* * * *

Cinder Screening at Destructors.

That the salving of cinders would mean a loss of revenue—not on account of the economic result of the operation itself—is a paradox which the Surveyors' Committee of Oldham have demonstrated by actual experiment. The issue was raised by the receipt of a request from the National Salvage Council that household refuse brought to the public destructors should be screened with the intention of saving cinders so that they could be made use of as fuel. The request is, of course, a general one; but the manager of the destructors showed that it would be rather unfortunate if its application became general. The amount of house refuse brought to three destructors during a fortnight, he states, was 851 tons, and the weight of the cinders expected to be obtained from such a quantity was, his experiments showed, 148 tons, or an average of 3½ cwt. per ton of refuse. It would be impossible to generate steam out of the refuse that would remain after the removal of the cinders, and this would mean that the supply of steam to the baths and washhouse, at present obtained from the destructors, and also to the workshops at Rhodes Bank, would be stopped. The loss financially would be about £175 a year, to say nothing of the fact that screening machinery would have to be installed, and labour for working this machinery would cost about 6d. per ton of refuse dealt with. In the circumstances it is not surprising that the Surveyors' Committee decided not to act upon the request of the National Salvage Council, though this body will possibly extract some satisfaction from the knowledge that the quantity of cinders found among the household refuse of Oldham is only 17 per cent. This could doubtless be still further improved under the pressure of a vigorous salvage propaganda on the part of the council, but only, as this particular example proves, at the expense of a larger purchase of coal for the purpose of obtaining the quantity of steam desired. It is, of course, obvious that the philosophy sought to be inculcated by the National Salvage Council could not be of universal application, and in any case they may argue that at Oldham their motto, "There is no rubbish," is after all translatable into terms of utility and economy.

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Heavy Motor Traffic (I.)

In March, 1915, the President of the Local Government Board appointed a Departmental Committee to consider the law and regulations relating to the construction and use of road locomotives and heavy motor cars in Great Britain; and in view of the anticipated increase in the number of these vehicles the recently issued report of this committee makes an opportune appearance. The committee was appointed in consequence of constant complaints by road authorities as to the damage that was being done, and the investigation has therefore been directed chiefly to the question of the damage done to roads by road locomotive and heavy motor traffic and the steps which should be taken with regard to such damage. Although the terms of reference did not cover an inquiry into the methods of road construction, it became necessary to examine the effect of heavy traffic on different surfaces and foundations. The conclusion arrived at is that wood-paved or asphalt roads on concrete foundations are best adapted to carry all classes of heavy traffic; while various forms of bituminous surface "will carry a considerable volume of heavy traffic without undue damage." The committee further find that paved surfaces are liable to damage from steel or iron tyred vehicles, while in the case of water-bound macadam roads damage is mainly due to rubber-tyred traffic. We are glad to observe that, with regard to the financial questions involved, the committee express a clear opinion that the cost of improving the roads to bear a greater volume of heavy traffic should be equitably adjusted between the local rates, the National Exchequer, and the users of the roads. Moreover, we agree that it is highly desirable that the fund at present at the disposal of the Road Board should be increased or supplemented so as to enable road authorities to accelerate the improvement of existing roads. In this connection consideration must be given to the proposal of the Departmental Committee on Local Taxation for direct grants from the Exchequer in aid of road maintenance, based upon a classification of roads to be framed by the Road Board. We hope to return next week to this important proposal—to which partial effect is given by the Exchequer grant of £8,250,000 which has just been announced by the board.

* * * *

War Roads and Transport.

Only gradually is the country realising the vast magnitude of the work which has been carried out with such conspicuous success in connection with the transport of men and material in the various theatres of war. Even those who have some knowledge of what has been achieved must have read with astonishment the wonderful statistics which were given in a recent issue of the *Times*. In the course of an article on Army transport, our contemporary pointed out that the extent of road construction in France may be gauged from the fact that each week there have been made 55,000 sq. yds. of

new road, while over 100,000 sq. yds. have been resurfaced. This work has involved an output from quarries worked by the British, which rose during 1917 from 40,000 to 70,000 tons a week. The extent of the achievements of the Road Corps may also be estimated by reference to the mileage of roads maintained. which rose from 3,000 miles in January to 4,500 in September. When it is remembered that from its chief downwards this magnificent organisation was largely officered by municipal engineers and manned by municipal employees, it will be realised that the profession as a whole has every reason to be proud of its members who have taken part in this glorious work.

ROAD AND BRIDGE PROGRAMME FOR 1919-20.

SUPPLEMENTAL GRANTS OF £10,000,000.

"The Government have agreed that, having regard to the desirability of stimulating employment on useful work at the present time, the expenditure of highways authorities in charge of the more important roads in Great Britain on the basis of their pre-war programmes of renewal and maintenance, enlarged as these will necessarily be by the rise of prices, shall be supplemented by grants in aid for additional work to an aggregate amount of £10,000,000, of which £1,750,000 will be provided out of the Road Improvement Fund towards works of improvement and £8,250,000 will be drawn from the National Exchequer."

The above announcement is made by the Road Board this week in a circular to highway authorities having reference to the arrangements in contemplation by those bodies for the carrying out of work in connection with roads and bridges in Great Britain during the current financial year and in the next financial year.

Mr. W. Rees Jeffreys, the secretary, states that the board have represented to the Government that the most useful kind of road work required at the present time is the strengthening, reconstruction, and resurfacing with improved materials of important roads and bridges, and that the lengths of road to be first dealt with should be those on which there is, or is likely to be, a large volume of heavy motor traffic, keeping in view, in the selection, all roads carrying considerable traffic, whether main roads or district roads, which have suffered deterioration during the war. It is recognised that the work of deferred renewal and maintenance will, in the immediate future, throw upon highway authorities a considerable amount of additional expenditure, and that all work carried out next year will cost more than it would have done at pre-war prices. In view of these circumstances, the board recommended that some special financial provision should be made.

ARRANGEMENTS FOR DISTRIBUTION.

The administration and distribution of the new grants will rest with the Road Board, subject to Treasury approval, and councils are asked to submit proposals to the board at the earliest practicable date so that there may be no avoidable delay in the final arrangements for putting the work in hand. It appears to the board that the most expeditious and convenient course will be to follow the general lines of the procedure which they adopted in connection with the proposed classification of roads in 1914, and that all proposals affecting roads or bridges in any administrative county in England and Wales, outside London and outside county boroughs, should be sent in by the county council, on behalf of themselves in regard to main roads, and on behalf of all other maintaining authorities in regard to district roads maintained by authorities other than the county council. It will be competent for any non-county borough council, urban district council, or rural district council to send proposals direct to the board, if they elect to do so, but it is hoped that, in order to ensure local co-ordination, they will comply with the request of the board that their proposals should, in the first instance, be communicated to the county authorities and then sent in to the board along with the proposals of the county councils.

No highway authority will be entitled to share in the new grants for additional work unless they submit a statement showing that they are arranging to execute, out of their own resources, at least as large a programme of road work as they carried out in the year ended March 31, 1914, or, in special cases, on the average of three years ended March 31, 1914, having due regard to the increase which has since taken place in the cost of executing road work, and are also making the maximum practicable provision to deal with works of deferred maintenance.

The selection of the roads and bridges in each administrative county on the repair, reconstruction, or improvement of which expenditure is to be undertaken will be settled by the board in consultation with the county authorities and such of the other highway authorities as the board may require to confer with in regard to any proposals put forward, but it is stated for the general guidance of highway authorities that preference will be given to roads which have the greatest importance from the traffic point of view, or roads which, having regard to their condition, urgently need repair or reconstruction to avoid further deterioration. The board suggest that it may be desirable in several counties to select for reconstruction some district roads which the authorities concerned are desirous of having declared as main roads, but which it has hitherto been impossible to put into such a condition as would justify the county surveyor in granting the certificate which is necessary before they can be taken over by the county as main roads.

The board consider it desirable that bridges on important roads, especially those which have to carry heavy motor traffic, should receive consideration. But it is not expedient in their view to appropriate any large proportion of the new grants to bridge work, for which the money can be borrowed for a long period of years. In order to encourage highway authorities to deal with a reasonable number of bridges, the board propose to consider proposals for grants on the basis of not more than one-fourth of the cost of reconstruction, leaving the highway authorities to borrow the remaining three-fourths. It is hoped that this may facilitate the reconstruction of about 200 bridges in various parts of the country.

LABOUR AND PLANT.

The board fully appreciate the difficulties with which highway authorities will have to contend in carrying out the contemplated programme of work, and they have requested the Government to release as quickly as possible not only some plant but also pivotal men whose services will be essential for the execution of the programme.

In view of the fact that road and bridge work offers useful employment in every locality at a time when it may be most needed, the board trust that highway authorities will make liberal financial provision and prepare as full a programme of work as it is practicable to carry out next year, and will place at the disposal of their engineers and surveyors the necessary technical and clerical staff to enable the preliminary work to be done in as short a time as possible.

As regards roads in the county of London and in county boroughs, applications should be made by metropolitan borough councils and county borough councils respectively, and the board suggest that it is very desirable that the metropolitan borough councils should confer together and should also, as far as practicable or necessary, confer with highway authorities in Greater London, so as to facilitate the co-ordination of the proposals generally which affect Greater London.

As regards roads in Scotland, applications should be made by county councils, district committees or burgh councils (though the amount available for the latter will necessarily be small) in accordance with the usual practice hitherto followed in dealing with Scottish highway authorities.

It is added that the new grants will be in addition to those which were made by the board before the war in respect of which work and expenditure were suspended. It will be open to the highway authorities concerned in these cases to resume the suspended works.

Forms of application for the new grants are in course of settlement, but, until these are issued, any council may make application in any manner that it may find most convenient, provided that all necessary particulars are given which will enable comparison to be made of the road work as a whole proposed to be carried out in the next financial year with the road work carried out in the year 1913-14.

CONTRACTOR'S CLAIM FOR "EXTRAS."

SEVEN YEARS' LITIGATION.

After litigation lasting seven years, a case against the Cardiff Corporation was finally decided in the House of Lords on Tuesday, when a verdict was given in favour of Mr. Robert Brodie against the corporation.

In November, 1910, Mr. Lewis Nott, since dead, entered into a contract with the corporation for the construction of an impounding reservoir in the Taff Fawr Valley, the price to be £201,077. During the progress of the works the engineer made a number of requisitions on the contractor as to the work to be executed and the materials to be used, and insisted that these requisitions were covered by the terms of the contract, and were included in the contract price. The contractor insisted that they should be treated as extras, and on the matter being referred to arbitration the arbitrator made an award in his favour. Mr. Justice Bray also decided against the corporation, but by a majority the Court of Appeal reversed that decision.

In the House of Lords on Tuesday the substantial question was whether the claim for payment was barred by the want of a certificate in writing. The Lord Chancellor and Lords Atkinson, Shaw, and Wrenbury decided against the corporation. Lord Sumner dissented.

Traction Engine and Heavy Motor Car Traffic.

RECOMMENDATIONS OF DEPARTMENTAL COMMITTEE.

Important recommendations regarding the weight, construction and speed of road locomotives and heavy motor cars, the restriction of heavy traffic on unsuitable roads, and other matters are made in the report [4d.] of the Departmental Committee appointed by the Local Government Board in 1915 to consider the law and regulations relating to these questions. The members of the committee comprised Messrs. E. Shortt, K.C. (chairman), A. G. G. Asher, P. M. Crosthwaite, M.INST.C.E. (Local Government Board), H. Howard Humphreys, M.INST.C.E., E. J. Lovegrove, M.INST.C.E. (borough engineer of Hornsey), J. E. Thornycroft, ASSOC.M.INST.C.E., and J. Willmot, F.S.I., (county surveyor of Warwickshire), and the witnesses included representatives of the Institution of Municipal and County Engineers, the County Surveyors' Society, the County Councils Association, the Association of Municipal Corporations, the Road Surveyors' Association of Scotland, the Tramways and Light Railways Association, the Urban and Rural District Councils Associations, and the Society of Motor Manufacturers and Traders.

ROAD LOCOMOTIVES.

The committee do not consider that it would be desirable to reduce the permitted weight of traction engines, as any such reduction would increase the difficulties of dealing with the haulage of heavy loads, and while it is doubtful whether it would have the effect of reducing road damage to any appreciable extent in the case of lighter loads, it would undoubtedly tend to increase such damage in the case of heavy loads. Commercially it is impossible to prohibit entirely very heavy loads, say the committee, and with such loads, heavier engines, if suitably tyred, do less damage to the roads than lighter engines.

WHEEL BANDS AND CROSS BARS.

With regard to the construction of wheels of road locomotives, the committee recommend that the tyre of each wheel should be at least 5 in. in width, and that where cross bars are used in driving wheels they should be placed at an angle which would secure that for at least one-half of the width of the tyre there should always be one or two cross bars in contact with the road surface.

Theoretically, the statutory provisions in regard to the construction of wheels of locomotives seemed to be open to criticism, but the committee state that the evidence did not appear to show that they were considered to be inadequate by road surveyors generally. One witness, it was true, suggested that the provisions should be reviewed, and submitted proposals somewhat on the lines of the regulations as to iron-tyred heavy motor cars, having in view as one object the securing of a line of demarcation between the locomotive and the heavy motor car by fixing for the former a minimum wheel diameter of 5 ft., and a minimum width of tyre of 14 in. An examination of these proposals showed, however, that in the case of large diameter wheels of 5 ft. and upwards the result would be very much the same as under the existing provisions; and the committee added that as the traction engine did not itself carry a load, there was not the same need for regulating width of tyre according to axle load and wheel diameter as there was in the case of the load-carrying heavy motor.

As regards narrow bands on steering wheels, several surveyors alleged that damage was caused to the roads by the use of these, though they did not all regard the matter as serious; and as it appeared from the evidence of the users and makers that the bands possessed considerable advantage in the case of both road engines and agricultural machines, the committee did not recommend their prohibition.

The damage caused to roads by locomotive traffic was attributed by several witnesses from the road and tramways authorities to the use of cross-barred driving wheels, and, while the majority of these witnesses considered that the cross bars should be absolutely prohibited, others, recognising the difficulties of prohibition, proposed alterations of the size of the cross bars or the spacing. Witnesses representing the traction engine industry and the users of heavy agricultural locomotives were strongly opposed to prohibition. They described the proposal as "impracticable" and "impossible;" they contended that smooth wheels, which were the only alternative, would very materially reduce the hauling capacity of the engines, would be useless and dangerous on gradients and in certain conditions of the road, and that with such wheels the heavy agricultural locomotives could not be used about the farms and on the land. One witness asserted that "the engines might as well be scrapped if we had to use smooth wheels." The committee were satisfied that serious damage was sometimes caused by the cross-barred driving wheels, and they considered that a strong case was made out for some amendment of the law in this respect. Total prohibition of the use of cross bars appeared to us to be quite impracticable, but they were of opinion that an amendment could be made which, without seriously reducing the hauling capacity of the traction engine or restricting the use of the agricultural locomotive, would nevertheless render the cross-barred wheel less injurious to the roads.

In making the recommendations already mentioned, the committee expressed the view that the use of cross bars should not be permitted on wheels of a smaller diameter than 4½ ft.

SPRINGS.

As to the suggestion that locomotives should be constructed with springs on the axles, the committee said they considered that such a requirement was desirable as tending to diminish the vibration which was caused by the passage of heavy engines over the roads. Moreover, the use of springs was compulsory in the case of all heavy motor cars. This requirement need not, however, apply to road rollers or ploughing engines.

Locomotives which have been constructed in accordance with the provisions now in force should not, it is recommended, be required to conform with any new requirements as to construction.

WAGONS DRAWN BY LOCOMOTIVES.

The committee regard as antiquated and unsatisfactory the provisions with regard to the weights which may be carried on wagons, carts, &c., drawn by locomotives, and they recommend that these should be repealed and new regulations substituted, based upon those applicable to vehicles drawn by heavy motor cars. They are of opinion that whatever may have been the reasons for the restrictions between cylindrical and non-cylindrical wheels, for prescribing in the latter case only varying summer and winter weights, and for requiring a width of wheel proportionate in the one case to the total load on the wagon (inclusive of the weight of the wagon), and in the other case to the weight on the wheel or pair of wheels (exclusive of the weight of the wagon), there was no adequate ground for retaining these distinctions at the present time.

Several road surveyors suggested that the new provisions should be based upon the regulations governing the trailer of a heavy motor car which imposed a maximum limit upon the axle weight, and determined the width of the tyre by reference to axle weight and wheel diameter. This suggestion, which the committee had decided to adopt in principle, was not, as they understood, opposed by witnesses representing the traction engine owners and users, provided that no reduction was made in the weights permitted under the existing provisions. It was not, in the view of the committee, practicable to require wagons to be provided with springs, their feeling being that it was preferable to encourage the use of springs by allowing additional weights on spring-mounted wagons.

The committee do not suggest any alteration in the existing provisions which limit the number of loaded wagons drawn by a locomotive or authorise the highway authorities to allow upon roads in their own areas the carrying of loads in excess of the weights ordinarily permitted.

NOTICE TO HIGHWAY AUTHORITIES.

It was represented to the committee on behalf of the road and tramway authorities that the damage caused by the haulage of exceptionally heavy boilers and other pieces of machinery was at times irrecoverable, because they were unable to trace the party responsible for the damage and to establish a case against him. Witnesses proposed that the road authority should be notified in advance of the intended use by such traffic of any road in its area. The suggestion generally made was that the notice should be sent to the county borough surveyor, or to the county surveyor, as the circumstances required, and that the county surveyor shall be required to notify the borough and district surveyor concerned. Some witnesses proposed that the notice should specify the road intended to be traversed and the day on which the traffic was to be expected; and some of them suggested that the road authority should be empowered to select the route to be taken. For a notice to a county surveyor 72 hours' notice was desired, for a notice to a county borough surveyor, 48 hours.

The traction engine owners and users did not appear to object in principle to the proposed notice, but they pointed out that cases arose where they were unable to give a 72 or 48 hours' notice, or where they could not conform to a detailed notice specifying the particular roads and the particular day.

The committee ruled out as unduly restrictive the suggestion that the road authority should be empowered to select

the route. It seemed to them to be clear that the notice, if it was to be of much value, must indicate the approximate route and the day on which the traffic might be expected, and further that some provision must be made to cover the practical difficulties referred to by the users. The case would, they thought, be largely met if the regulations required such a notice to be given, and that wherever practicable the notice should be at least 72 hours to the county surveyor and 48 hours to the county borough surveyor, or, in the case of the metropolis, the city engineer of the City of London or the surveyor of the metropolitan borough council, and in any event notice should be given before the journey was commenced and before the engine was allowed to pass from one county area into another.

SPEED LIMITS.

The committee see no reason for altering the speed limit of 4 miles an hour in the country, but express the opinion that the limit of 2 miles an hour in towns and villages is calculated to cause obstruction and congestion, and should be raised to 3 miles an hour.

HEAVY MOTOR CARS.

The committee recommend that the unladen weight of the heavy motor car should be raised from 5 to 6 tons, and that the combined unladen weight of the car and trailer should be raised from 6½ tons to 8 tons.

Other recommendations of the committee under this heading are as follows:—

(1) The definition of the unladen weight of a motor car should be amended.

(2) The maximum laden weight and the maximum axle weight should not be altered.

(3) The minimum diameter for wheels of heavy motors fitted with iron, steel or other hard tyres should be raised from 2 ft. to 2 ft. 9 in., and a scale of minimum diameters should be prescribed, according to registered axle weight, where the registered axle weight exceeds 4 tons.

(4) The edges of a tyre of iron, steel, or other hard material should be rounded. Bevelled edges should not be permitted.

(5) The diameter of any wheel of a heavy motor, which is fitted with a solid rubber tyre or other tyre of a soft or elastic material, not being a pneumatic tyre, should not be less than 2 ft. 6 in. No regulation need be made as to the size or shape of the tyre itself.

(6) The existing law, which permits a motor car to be used to draw one trailer only, should be retained. Certain minor amendments should be made in the regulations relating to the use of trailers.

(7) The present speed limit regulations should be retained, subject to the following amendments—namely, (*a*) that the speed for a heavy motor car tyred with iron, steel, or other hard substance should not in any case exceed 5 miles an hour, and (*b*) that where a heavy motor car draws a trailer and the wheels of both vehicles are fitted with rubber tyres, the maximum speed should be 8 miles an hour.

WHEEL DIAMETER AND TYRE WIDTH.

The committee state that most of the witnesses who discussed the effect of iron and steel tyres upon the roads expressed the opinion that an increased diameter of wheel was more important than an increased width of tyre. They add:—"There appears to be no doubt that any substantial increase in the diameter tends to diminish the strain on the road due to the pressure of the loaded wheel. The reasons are obvious. In the first place the use of wheels of large diameter increases the effective area of the road surface actually in contact with the wheels, thereby reducing the intensity of the weight pressure. In order to reduce the weight pressure the area in contact with the road must be increased either longitudinally by an increase in the diameter or laterally by an increase in the width of the tyre. Owing to the camber of the road an iron or steel tyre which is very wide does not secure effective contact for its whole width; the limit of width at which such a tyre ceases to be effective is variously given by witnesses at 8 to 10 in. On the other hand, assuming that the road surface is not absolutely rigid, it would seem that an increase of diameter is bound to result in an increase of the area in contact. In the second place, where impact is set up by a vehicle in motion, the larger diameter tends to lessen the force of the impact, because at a given speed the larger diameter reduces the number of revolutions of the wheel, and that reduction of the wheel speed has the effect of diminishing the force of the impact. In the third place, on a yielding surface the larger diameter reduces the resistance which the vehicle has to overcome, and thereby lessens the strain on the road due to the effort the vehicle is making.

"It is clear that on a yielding road surface, given the same amount of weight on the wheel, the small wheel penetrates more deeply, and the deeper the penetration of the road surface the greater the propulsive effort the vehicle has to make. On the other hand, it has been pointed out with considerable force that an increased diameter involves both an increase of the unsprung weight, due to the added weight of the wheel itself, and also an increase of the total unladen weight, due to the increase in the weight in, *e.g.*, the gearing and axle, rendered necessary by the increase in the diameter of the wheel. Moreover, there are difficulties in the way of a larger wheel from the point of view of the height of the platform for loading, and of the probable curtailing of load space. We are, however, strongly of opinion that the advantages of an increased diameter outweigh the disadvantages."

RESTRICTION OF HEAVY TRAFFIC ON UNSUITABLE ROADS.

Concerning the restriction of heavy traffic on unsuitable roads, the committee recommend that existing motor-omnibus routes should be left untouched, but that new routes to be established must have the consent of the highway authority, or, if that consent was refused or was given subject to unreasonable conditions, the consent of the Local Government Board. Powers should be conferred on the Local Government Board and the road authorities to regulate through heavy motor traffic in order to secure that such traffic was, as far as practicable, required to use the roads which were constructed to carry it. County councils should be given power to regulate traffic upon a road which was under repair or reconstruction, and to divert the traffic on to another road.

The committee express the view that the evidence which had been given as to the serious damage caused to a number of roads by motor-omnibus traffic, and the very heavy expenditure entailed in improving these roads to render them fit for the traffic went far to prove that this traffic was exceptional in character, presented special difficulties to highway authorities, and required special treatment. They are of opinion that much of the damage and expenditure might be avoided if there existed between the motor omnibus companies and the highway authorities, both local and central, the closer co-operation which might be expected to result from placing motor-omnibus traffic under control. With closer co-operation it should often be found possible to abstain from using a road which was known to be unfitted for the traffic, or, if such a road must be used, to carry out the necessary works of improvement before the service had commenced, and consequently under more favourable conditions and at less cost.

ROADS AND FROST.

Several witnesses for the road authorities suggested that there should be some power to prohibit or regulate heavy traffic so as to protect from damage roads which were for the time being unfitted for the traffic owing to the break-up of a frost. The committee doubted whether any scheme involving restrictions of heavy traffic in such circumstances was feasible, and they added that the solution of the difficulty appeared to lie, mainly, in the provision of road surfaces which were not liable to be seriously affected by frost.

SPECIAL QUESTIONS.

The committee desire to place on record their conviction that the question of the strengthening or reconstruction of privately-owned bridges over railways and canals is one requiring immediate consideration with a view to legislation at the earliest possible date. They are also of opinion that the public demand for improved facilities for road transport requires that the Local Government Board, and in the case of railway bridges the Board of Trade, should have more direct control than is given by the present law and regulations so as to secure that heavy motor traffic is not hampered by the placing of restrictions on the use of bridges which are not in fact necessary.

It appears to the committee to be very desirable that the public funds should be made available to encourage the design and construction of mechanically propelled vehicles calculated to cause less damage to the roads than some of the types at present in use. Facilities should also be given, by special licence or otherwise, to enable trials and demonstrations to be held of self-propelled vehicles which cannot ordinarily be used on the roads without breach of the law.

SCOTLAND.

As regards Scotland, it is suggested by the committee that the law in force in England and Scotland should, as far as possible, be assimilated. The idea of the committee is that where the provisions in force are practically identical, amendments corresponding with those which it is recommended should be made in the English provisions should be made in the Scottish provisions.

Taking no Risks.—A firm of wood paving contractors engaged on operations in Pall-mall have taken the unusual precaution of surrounding the stacks of blocks of wood by high wire fences, so that it is impossible for them to be interfered with.

SPECIAL NOTICE.

As, owing to the Christmas holiday, it will be necessary to go to press on Tuesday, the 24th inst., with next week's "Surveyor," news matter and advertisements intended for that issue should be posted to reach us not later than 12 noon on that day.

The Disposal of Sludge.

By F. T. HAMBLETON, Newcastle-under-Lyme.

[The following paper was awarded the first prize in a competitive essay scheme arranged by the Association of Managers of Sewage Disposal Works.

The disposal of sludge, and all that the words imply, has been for some time a continual source of interest and thought, and incidentally trouble and anxiety, to everyone whose business it is to deal with the disposal of sewage by methods other than broad irrigation.

To the general public it has been a matter apparently regarded with much prejudice and suspicion, and the one idea they have in their minds is that sludge has no value and is only a source of nuisance.

It seems as though no general or universal method can be adopted—there is no standard method—for sludge disposal. No sludges have exactly the same composition, and very few managers can adopt the same means for its disposal, because the conditions and circumstances are very seldom the same. For where one may conveniently and economically dispose of his sludge on land, another may have no land for the purpose, or, if he has, it may not be suitable.

It is therefore expedient that each manager should make a study of the sludge produced at his own particular works, find out any peculiarities or any special qualities, and make use of the best methods at his disposal or that he can adopt, both for expediency and economy or if possible for profit. It is for this reason, then, that I will try to confine my remarks to the efforts, experiments and results obtained in disposing of the sludge produced at the works of which I am in charge.

Size of works	... ...	For a population of 21,000
D.W.F.	... ...	Approx. 1,000,000 gallons
Sludge produced	...	500,000 gallons per annum

The works are situated ½ mile from centre of town and directly opposite to a large hospital, so it is essential to keep smell at a minimum.

There are six sedimentation tanks about 60 yards from busy main road.

The tanks are constructed at a lower level than the reservoir for the sludge, all the sludge having to be pumped out.

There are 6 acres of land in conjunction with the works suitable for the disposal of sludge; 2½ acres of this are adjoining the sludge reservoir and 3½ a short distance away. When I was appointed some nine years ago, the 3½ acres were let at a very low rental and the 2½ acres were growing wild.

The sludge question was recognised as the bugbear of the place—a new works laid out three years previously on the most up-to-date biological principles. The 500,000 gallons of liquid sludge was being carted away in tub-carts to any place where the carters could find a tip. The cost of this was over £4 per week for carting alone, and the return from it—nil.*

This therefore was the aspect in which I first met the problem of our subject. My first idea was that as the sludge contained a large amount of excreta (the sewage being domestic, with very little trade waste), there must be some value in it as a manure. The land was taken over and the overgrown land cleaned and cultivated, and this was used for experimental purposes in the growth of various vegetables, &c., using only sludge as manure.

Now much has been said and written about the use of sludge as manure, and in many cases people have endeavoured to point out that it has little or no value; but on the other hand the opinion of some managers and others who deal with this sludge is in a different direction, and they say that when applied to the land in a proper manner it has a value. They say they can prove by practical results that it is of more value than one would think from the figures of analyses.

If there is still a doubt the present is a most suitable time to try to prove its value. Fertilisers are urgently needed, and especially cheap ones, and if it can be proved to be of value either by a process of preparation, extraction or addition, and the process will warrant the expense of such preparation, then we should have a wide outlet for its disposal. . . .

The sewage works manager generally should know the quality and features of the sludge on his works, and he should be willing to give his fellow-members of the association and others the benefit of his knowledge and experience. It is only by such co-operation that we shall eventually attain the best methods of disposing of sludge.

Take the composition of an average air-dried sludge. It contains ammonia, phosphates, lime, sodium, organic matter, iron and silicious matter chiefly, and other substances in smaller quantities. There is certainly plant food here. There is a great amount of moisture, but this must contain in solution ammonia and soluble substances of the original sewage, which, when applied to land, become oxidised and converted into nitrates by the action of air and bacteria and thus present a valuable plant food which can be quickly assimilated.

I do not wish to state generally that sludge is of any great value as a manure—it would be too contradictory to very many eminent persons' opinions; but my opinion is that there is some value, and I am led to say this only by the results I have obtained.

I have previously stated that it is up to each manager to adopt the best and most profitable means at his disposal. In my case these are by applying to land the sludge in liquid form. There are, very fortunately, the 2½ acres of land which gradually slopes from the sludge reservoir. This land is ploughed and worked in the usual manner, except that the furrows are made a little deeper than in usual practice. The more working the land has the better it seems to suit the crops, as no doubt the air and bacteria become more active in the soil.

The ridges are planted with brassica and potatoes. While the crops are on the land the liquid sludge is run into the furrows by letting it overflow as it is pumped into the reservoir into a system of cross gutters. When the land is clear of crops it is ploughed, and the sludge evenly and thinly distributed over the surface. The cost of this is very little. For instance, the sludge pump is driven by a 11-h.p. gas engine, and the cost of so disposing of 77,000 gallons from June 3rd to June 6th, 1918, was actually—

	£	s.	d.
Gas—5,000 cub. ft. at 3s. per 1,000	0	15	0
Oil	0	1	0
Men's time regulating the sludge on land and emptying tank, 1 man 4 days at 6s.	1	4	0
1 man 4 half days at 6s.	0	12	0
	£2	12	0

Therefore if 500,000 gallons (12 months' production) could be so disposed of, the cost equals	£16	18	0
This against previous cost £4 per week for carting above, or	208	0	0

There is the cost of working the land, but the amount realised from the sales of crops from this plot was over £100, which more than pays for that.

The 3½ acres are a short distance away, but the method adopted is quite similar, but this costs a little extra as the sludge has to be carted away in tubs. When conditions are favourable it is allowed to follow the furrows, but when not it is stored in a tank, the floor and sides of which are constructed of house refuse and ashes. Here the sludge dries, and when suitable is spread about the land. It further dries, and in the course of the ordinary working of the land, ploughing, &c., it is thoroughly incorporated into the soil.

I give the land a dressing of lime—5 cwt. to the acre—between the months of January and March.

Last season's result from all crops from 12½ acres of land, with only sludge and storm-water as manure, was £530.* This is by far the best result obtained, although the amount has gradually increased annually for the last eight years.

On a small scale I have tried dried sludge mixed with superphosphate, basic slag, potassium sulphate or chloride, ammonium sulphate or bone meal. This mixture gives better results bulk for bulk than if sludge is used alone, the quantities added depending on the condition of the soil. The mixtures were very suitable for cabbage, swedes, potatoes, peas and beans, meadow hay and pasture land.

Mangolds and beet did better with a small quantity of salt added.

In each case the ratio of superphosphate, bone or basic slag, mixed with sulphate of ammonia or sulphate of potash, was somewhere about 3 of the former to 1 of the latter.

Another substance tried with good result was wood ashes.

The above then is the method adopted for disposing of the sludge, but the decision was not arrived at without first and subsequent experimenting in other directions, and I now propose to give the result of at least one other method, hoping that if it serves no other purpose it will at least provide food for thought and perhaps urge others with more knowledge and experience than myself to carry it on to more useful service.

(To be concluded.)

* The cost of carting nowadays would be nearer £8 to £10 per week.

* £530, made up as follows:—

Mangolds, 7 acres	£317	13	7
Swedes, 2 acres	79	16	0
Cabbage, 3 acres	110	13	8
Potatoes, ½ acre	22	9	8
	£530	12	11

Building By-Laws.

DEPARTMENTAL COMMITTEE'S PROPOSALS FOR REFORM.

The report of the Departmental Committee appointed in 1914 "to consider the control at present exercised in England and Wales over the erection of buildings and the construction of streets by means of by-laws and local regulations, and their effect upon building and development," was issued on Friday last [6d.]. On the outbreak of war the sittings of the committee were suspended, and it was not until November of last year that they were resumed. Among those who gave evidence before the committee were Messrs. T. C. Barralet (Institution of Municipal Engineers), E. J. Elford, M.INST.C.E., and J. A. Webb (Institution of Municipal and County Engineers), D. M. Jenkins (Welsh Housing and Development Association), W. T. Lancashire, M.INST.C.E. (Association of Municipal Corporations), and E. Willis, ASSOC. M.INST.C.E. (National Housing and Town Planning Council).

LEGISLATIVE PATCHWORK.

Reviewing at the outset of their report the present legal systems, the committee call attention to various anomalies illustrating the haphazard legislation which has been enacted on the subject of new streets and buildings. They add that the reason for peculiarities of this kind is not far to seek. The provisions as to streets and buildings in the Public Health Acts have for the most part originated in local Acts passed for the regulation of particular towns or districts. Each such area has sought from Parliament the powers which it considered suitable for its own case, and concurrently with this tendency to dissimilarity there has been a co-ordinating process due to the fact that it was easier to secure the assent of the Local Legislation Committee or their predecessors to provisions which had already been allowed elsewhere than to new provisions. The consequence has been that a clause originally devised to meet the circumstances of one district has been repeated in local Acts obtained for other districts until it became a common form, and these common form clauses were collected by Parliamentary agents and inserted in the Bills they were instructed to promote, sometimes, apparently, chiefly for the reason that other towns already had such powers, until finally a certain number of common form clauses have been brought together into the general Acts which are now the Public Health Acts Amendment Acts of 1890 and 1907. Even the provisions with which the committee have been concerned in the principal Act of 1875 had their origin in much the same way, having been imported from the Local Government Act, 1858, which itself was based upon earlier local legislation.

The result of this process has been a legislative patchwork under which the control by local authorities of building and development is restricted to particular topics or particular purposes, while there are many gaps and many sections on similar subjects which do not fit together. In the committee's opinion restrictions of this kind, where they are really technical (such as that which limits building by-laws to certain portions or members of a building and by-laws as to walls to three specified purposes), should be removed, and some power should be given in the direction of enabling local authorities by means of by-laws to exercise control in all matters which are of such a nature as to require control in the public interest and to be suitably controlled by means of by-laws.

BY-LAW-MAKING POWER.

It is recommended by the committee that the statutes in the general law authorising by-laws to be made should be consolidated, the opportunity being taken to stop any obvious gaps, to add any powers which might be exercised suitably by all authorities, and generally to widen the by-law-making power as suggested above. These powers should be given to all authorities alike, it being left to the Local Government Board, under Sec. 184 of the Public Health Act, 1875, to consider, on the merits of each case, whether a particular by-law-making power should be exercised in a particular locality. Further consideration should be given to a suggestion of one of the representatives of the Association of Municipal Corporations that when the specific topics have been enumerated on which for the moment Parliament considers by-laws should be made, a power should be conferred on the board to add other topics, by Provisional or other Order, as they can do now where a local Act gives by-law-making powers. The committee also recommend as a matter of urgency such an amendment of the statutory definitions of "new building" that works which cannot be reasonably subject to the control properly applied to the erection of a new building shall not be classed as such. Hitherto a mere addition to an existing building—a bay window or a porch—has been capable of inclusion under the definitions.

BY-LAWS AS STANDARD METHOD OF CONTROL.

Certain powers incorporated in common-form clauses in local Acts should, it is proposed, be made available in the general law, and Parliament should not give special local powers for purposes which can be secured by by-laws under the general law. All sections in Acts of Parliament giving powers with respect to new streets and buildings should, so far as possible, take the shape of authorising by-laws to be made. By-laws made by the local authority and confirmed by the board for the control of streets and buildings should be recognised as the standard method of control, to the exclusion (unless by-laws are clearly the less appropriate method) of direct statutory provisions, of discretion, and of "regulations"; and where Parliament is satisfied that new local Act powers are essential they should, whenever possible, be in the shape of a by-law-making power. Local Act sections within the terms of reference should be required to be printed and supplied without charge as by-laws are. Where a clause is shown to the satisfaction of the Local Legislation Committee to be unsuitable, any powers given with respect to new streets and buildings should be limited in point of time, with authority to the board to extend the time by Order (not provisional).

It is the view of the committee that regulations, as distinct from by-laws, should be abolished. The distinction between urban and rural authorities should be swept away, unnecessary or unsuitable by-laws proposed by an authority of either class being refused by the Local Government Board.

A DEFECTIVE SECTION.

An important recommendation of the committee is that Sec. 44 of the Housing and Town Planning Act shall be altered so as to give the Local Government Board the powers intended for it.

This section, it is pointed out, has two defects. In the first place it is confined in its operation to the erection of dwellings for the working classes, whereas—the committee observe—there is no more reason why a person building a palace or a factory should be afflicted with unreasonable by-laws than a person who puts up a workman's dwelling; and secondly, it requires, before the Local Government Board can take action under it, that an actual impediment to building must be proved to exist in the locality concerned. It is the language of the section and not any want of willingness on the part of the board to see by-laws brought up to date, which appears to have rendered the section nugatory in practice. Very little amendment of the section seems to be required to make it satisfactory in future; and although the committee do not go so far as to recommend, as was urgently suggested by one or two experienced representatives of local government, that the adoption of the model code be forced on all authorities without proof that the local series is defective, they recommend that the board should at once seek from Parliament powers of effective action when the need is shown, by procuring the repeal of the words which have led to difficulty.

TIME LIMIT FOR BY-LAWS.

The committee also recommend that all by-laws confirmed prior to 1901 shall be swept away, and those up to 1910 at a slightly later date, and that by-laws should automatically lapse after ten years from the date of confirmation. This would not necessarily mean that any considerable change need be made, for if neither the Local Government Board nor the local ratepayers objected, the old by-laws could be confirmed again and resume their force.

A further proposal is that the Local Government Board should have power to make amending Orders which, in the absence of opposition, need not be provisional.

REJECTION OF PLANS.

The committee's next recommendation is that a local authority rejecting a plan should be required to specify in writing the particular respect in which its carrying out would be illegal. On a joint request from both parties, the Local Government Board should have power to decide (subject to the power to state a case in the High Court) whether rejection of a plan is lawful. Failing such an agreement, either party should have the right to apply for a declaration to a court of summary jurisdiction, with appeal to quarter sessions.

NEW STREETS.

By-laws, it is considered, should be authorised for fixing the distance between the buildings in new streets. Power should be given to prevent the alteration of a street in such a way that, if made so at first, it would have contravened the by-laws. Clauses with respect to new streets should secure, so far as practicable, some constructional work, at least of an elementary kind, at the stage of laying out, and local authorities should be required when putting forward their constructional by-laws for new streets, to formulate in advance

a maximum specification or specifications on compliance with which they will take over streets.

The committee suggests it should be made the duty of every local authority to adopt at least some building by-laws, and, in default, order provisions with the same effect should be put in force by the Local Government Board. This board should have power also to appoint the county council to execute by-laws in place of a local authority failing to enforce them. Power of proceedings in such a case should be given to the county council or any ratepayer or inhabitant, suitable provision being made as to the reimbursement of costs.

NO EXEMPTIONS.

The committee make recommendations with regard to exemptions under the Improvement of Lands Acts, and in favour of buildings in which Government Departments are interested, with the object of securing that all buildings shall come within the purview of the local authority. The committee do not recommend exemption from by-laws in the transition period following the war, in respect of the houses proposed to be erected as part of the Government housing scheme, according to plans approved by the Local Government Board. They think reliance should be placed on the wider powers which they recommend should be given to the Local Government Board, as, if the local authority fail themselves to take into immediate consideration the question of amending any by-laws they propose to contravene, the board will be able to take action so that it shall be possible in the proper way—*i.e.*, through rescission of the offending by-laws—for other persons to enjoy the same advantages as would have been gained by the short cut of exemption.

Every encouragement, it is agreed, should be given to private enterprise in the housing of the people, and it is considered undesirable that private builders should be penalised by having to comply with obsolete or unnecessary by-laws from which schemes publicly promoted have obtained exemption.

BORROWINGS BY LOCAL AUTHORITIES.

LOCAL GOVERNMENT BOARD CIRCULAR.

A Local Government Board circular to local authorities states that the board are now, in conjunction with the Treasury, prepared to consider applications from local authorities for permission to raise loans in order to enable them to put into operation schemes of public utility, such as housing, water supply, sewerage, hospitals, gas and electricity, and construction and improvement of roads, which are of urgent importance.

The circular states that Sir Auckland Geddes is particularly desirous that all schemes for housing the working classes after the war should be submitted to the board without delay, and in consequence wishes to receive as early as possible from the local bodies the necessary particulars of any works the councils are preparing to carry out at once and pay for by means of loans.

If any necessary sanction to the borrowing of money has already been obtained, it will be sufficient to state the nature of the works contemplated, when they will be put in hand, the period required for their execution, and the number of men to be employed, classifying them as far as is practicable. If such sanction has not been obtained and the sanction required is that of the Local Government Board, application should be made as early as practicable, by resolution of the council, of which a copy should be forwarded accompanied by drawings and estimates.

The Treasury draw attention to the impossibility of providing any large sums for advances from the Local Loans Fund, and state that it will not be possible at present to consider applications for loans from that fund except in the case of the smaller authorities for very urgent services, and then only to a very limited total amount. With this exception it is essential that the necessary loans should be raised locally by the authorities concerned.

Wigston Sewage Farm Profits.—At the recent meeting of the Wigston Urban District Council, the surveyor, Mr. W. G. J. Clark, reported that the sale of wheat and oats grown on the sewage farm showed a profit of £424.

Cardiff and Town Planning.—The city engineer, Mr. E. J. Elford, in a report on housing and town planning, suggested that the area of Cardiff in respect of which it was desirable to start to prepare town planning schemes should be divided into three sections—viz., Central, East, and West—and that the sections should be dealt with one at a time as far as the preliminary work was concerned. Mr. Elford proposed that the city council should commence with the Central area. The Housing and Town Planning Committee, after considering the report, resolved to take steps to apply for authority to prepare a scheme.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Do not the three road construction papers which came before a recent meeting of the Institution of Civil Engineers tend to show that a great change is taking place in our views upon this subject, and that the road of the future will have to be much more scientifically designed, constructed and maintained than has been the practice in the immediate past? Is it not evident that the composition of the so-called asphalt used for the surface, as well as foundations and drainage will all require very careful thought and investigation? It is not to be hoped—and expected—that road engineers will be able to grapple successfully with the problems that are now presented?

* * * *

Apropos of the gathering above referred to, is it not rather to be regretted that the meetings of the institution are not open to the Press, and that, apart from printing abstracts of papers read, professional journals are unable to give any report of the proceedings? Would not unrestricted publication of both papers and discussions be likely to elicit correspondence and criticism of the greatest value; and is the institution doing full justice either to itself or to those who submit papers at its meetings in declining the publicity which is allowed—and welcomed—by practically every other engineering society?

* * * *

Is there not considerable novelty in a recent proposal in the *Motor* that motor vehicles should be taxed according to their registered speeds, the idea being that the gross weight should be multiplied by the speed squared, multiplied by a constant of ·2, so that taking a motor weighing 1¼ tons, travelling at 20 miles an hour, the tax would be £6, and with the same car travelling at 50 miles an hour £37 10s.? But would it be possible so to regulate a car that it could not travel beyond its taxed speed? And what about a car "taking charge" down a hill? Is the suggestion practicable, and has it really yet been ascertained that speed is the dominant factor in road damage?

* * * *

Was not Mr. L. D. Thompson, the county surveyor of Cornwall, quite right when he stated in a recent report to his council that he was of opinion that steel-studded tyres did far more damage to the roads than those of rubber only, and that he "had always been surprised that they had been permitted"? Can we not all share in his surprise, and is it not to be regretted that legislation with regard to roads seems always to be carried through without regard for the views of those who are responsible for their upkeep?

* * * *

Is it not rather remarkable that although the Chief Constable of Exeter has pointed out in a report to the city council that the recent order of "Keep to the left" for pedestrian traffic has been most beneficial, and that in 1914 26 per cent of the street accidents in which personal injury resulted were due to persons stepping off the footpath with their backs to the stream of traffic, notice was given of a resolution to be moved at the next meeting that the "Keep to the left" order be withdrawn?

CORRESPONDENCE.

(One man does not see everything.)
—EURIPIDES.

THE ROAD CONSTRUCTION AND QUARRYING COMPANIES.

To the Editor of THE SURVEYOR.

SIR,—At a meeting of the committee in connection with the provision of extra necessaries and comforts for the Road Construction and Quarrying Companies in France held on Thursday last at Preston, the sum of £1,500 was voted from the fund for the purpose of providing special comforts on Christmas Day for the men engaged under Brigadier-General H. P. Maybury, C.B., in France.

The total amount contributed to the fund is about £10,434, the expenses connected with printing, postage, &c., amounting to £252 8s. 6d., leaving a balance for distribution of £10,181 11s. 6d. Comforts amounting to the value of £9,792 have been or are about being distributed to the men, many of whom have expressed their appreciation of the efforts made on their behalf.

A full statement of accounts will be published at an early date, and a copy of each, together with a report of the comforts provided will be forwarded to all contributors.—Yours, &c.,

E. J. MORGAN.

Town Hall, Bolton.
December 13, 1918.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

BUILDINGS.

Galashiels T.C.—The town council have approved a scheme for the extension of the municipal buildings as a memorial to Galashiels men who have fallen in the war. The cost will probably exceed £15,000, and a local fund to meet this is being liberally supported.

Stafford T.C.—A sub-committee has been appointed to confer with the borough engineer, Mr. W. Plant, with respect to the provision of a new fire station.

REFUSE COLLECTION AND DISPOSAL.

Baldock U.D.C.—The council have given instructions for leaflets to be printed and circulated, informing occupiers that all dwelling-houses within the urban area must be provided with proper sanitary dustbins, fitted with water-tight covers.

Blackburn T.C.—The Cleansing Committee have approved a recommendation of the borough engineer, Mr. A. T. Gooseman, to substitute fans for forced draught in place of the present steam jets at the Throstle-street destructor. Mr. Gooseman proposed using an old engine, shafting and pulleys which have been discarded, and were formerly used for driving a flag-making plant. The estimated cost of the work was stated to be £250, and the borough engineer estimated that the alteration would more than pay for itself in the first twelve months, owing to the extra amount of steam that could be generated. The steam is used for the purpose of driving the pumps belonging to the Waterworks Committee for pumping the water to the high level service reservoirs.

Gillingham T.C.—The borough surveyor, Mr. J. L. Redfern, has received instructions to prepare a report on the desirability of constructing a dust destructor, and the probable cost.

Hythe T.C.—The borough surveyor, Mr. J. S. Green, reported that he had issued 106 notices respecting the providing of new ashbins at dwelling-houses. He had received excuses to the effect that such dustbins could not be procured. Five members of the town council were served with notices. It was stated by councillors that there was a difficulty in obtaining bins, and it was agreed that two dozen be purchased, so that there might be no excuse that these articles were unobtainable.

ROADS AND MATERIALS.

Bedford T.C.—The town council have approved plans for the proposed Midland-road and Prebendary-street improvement, at an estimated cost of £325.

Blean R.D.C.—With regard to a proposed scheme for the improvement of the road between the Herne Bay eastern boundary and the Whitstable western boundary, which has been in abeyance during the war, the council resolved to submit the matter to the county council with a view of ascertaining whether the Road Board would be prepared to proceed with the work.

Burton-on-Trent T.C.—It is stated that the proposed purchase by the town council of 100 acres of land at Stretton for the erection of houses will involve the construction of a new road from Hornington to Stretton railway station, and a new circular tramway route.

Camberwell B.C.—The Works and General Purposes Committee report upon the receipt of a letter from the Chief Commissioner of Police, stating that much inconvenience and some danger, resulting in fatal accidents, has been caused owing to the lack of any uniform system of lighting road obstructions, and that risks would be avoided if obstructions were indicated after dark by a uniform system of lighting. Attention was called to the manner in which the London County Council mark all obstructions in connection with tramway works. It was suggested that road works and other dangers, such as founderous places, newly filled trenches, unrolled road metal, &c., should be marked after dark by red lights, which should indicate the extreme width of the obstruction, and in the case of lateral obstruction the lights should be no further apart than 4 ft. The committee express concurrence with the suggestions made, and state that they would agree to appoint representatives to attend a conference of local authorities on the subject, if such should be called.

Cheltenham T.C.—It is proposed to lay down slab-paving on the footpath of Bastile-road, at a cost of £200.

Devon C.C.—In moving the report of the Bridges, Main Roads, and County Buildings Committee, Lord Portsmouth stated that the roads were in a bad state, but, having regard to all the circumstances, they did not propose to take any action. The committee, however, considered that no quarterly payments should be made to the Broadwoodwidger and Culmstock Rural District Councils, and that £500 should be withheld from the quarterly payment due to the Totnes Rural District Council. Replying to comments upon the condition of certain roads, Lord Portsmouth stated that the committee were doing all they could with the roads, but they were handicapped by the attitude of the Road Control Board as to the quantity of stone allowed. He asked the committee to consider the possibility of giving the roads a better chance by an addition to the by-laws requiring motor traction to keep on the left-hand side, which, he thought, would tend to the convenience of traffic and the conservation of the roads.

Dover T.C.—The borough surveyor, Mr. W. C. Hawke, has received instructions to prepare a report on the damage caused to the roads in the borough by Government traffic.

Hythe T.C.—The borough surveyor, Mr. J. S. Green, reporting with regard to Prospect-road, said there was no question that the damage to this road was largely due to excessive military traffic, and the proposed scheme for putting it in thorough repair would cost £2,400. It was the intention of Mr. Knight (local engineer to the Road Board) to recommend that there should be a contribution from Government funds of £1,464. It was decided to approve the scheme, and make application for a loan to meet the council's share when the Road Board had sanctioned the work.

Norfolk C.C.—As the result of an experiment under the supervision of the county surveyor, Mr. W. W. Gladwell, at Tilney, it has been decided that any soil which is above the level of the metalled surface of the main roads may be removed from the sides by tenants of adjoining land on application to the district surveyors. The decision is to apply to all districts.

Sheffield T.C.—The War Office (Road Stone Control Committee) has now removed the prohibition on the use of road metal and setts for roads which were not certified to be of national importance; and a number of secondary roads in Sheffield, the repair of which have been delayed owing to this prohibition, can now be taken in hand. Therefore a request has been made for the release from the army of men who are urgently needed for road purposes. Whatever assistance is possible is to be given by the city surveyor's department, at the request of the Minister of Labour, to afford convalescent officers and others the opportunity of gaining knowledge and experience of the department's work.

Wolverhampton T.C.—The Public Works Committee recommend the town council to purchase property in North-street, Red Lion-street, and Corporation-street, for improvement purposes, and also to make application to the Local Government Board for power to borrow £3,600 to cover the cost.

SEWERAGE AND SEWAGE DISPOSAL.

Epsom R.D.C.—The surveyor, Mr. W. T. Wooldridge, reported that, owing to the want of men, the emptying of cesspools in the parish of Cuddington was held up. He suggested that the council should consider the question of a scheme for the drainage of the remainder of the parish, and the clerk was instructed to ask Mr. Midgley Taylor to prepare a scheme, subject to that gentleman's fee being agreed upon.

Midleton U.D.C.—A report dealing with the sewerage system at Railway-terrace has been submitted by Mr. Richard Evans, who recommends that new sewers should be laid, at an estimated cost of £300. He also states that a further extension along Park-street could be made, at an additional cost of £120.

Norwich T.C.—It was reported that the revenue account of the Whitlingham Hall sewage farm showed an excess of £2,492 of income over expenses for the year ended October 11th last. The city council have approved a report and estimate (at £2,500) for sewer extension and surface-water sewers in Aylsham-road. To keep the cost within reasonable bounds excavation and filling will be effected by the aid of a trench machine and a mechanical rammer. The city engineer, Mr. A. E. Collins, estimates the cost will be some £700 less if such machines are provided. The machines will be available for other sewerage work ordered by the council, but suspended by reason of the war.

Warmley R.D.C.—Frequent complaints as to the smells from the Bath sewage works were referred to in some correspondence with the Local Government Board. The board stated that they were trying to arrange a conference at the works to go into the question.

WATER, GAS, AND ELECTRICITY.

Glasgow T.C.—The Electricity Committee recommend acceptance of the tender of Messrs. Babcock and Wilcox, Limited, to supply equipment for the second boiler-house at the new

generating station at Dalmarnock, consisting of eight boilers, stokers with force and induced draught, economisers, chimneys, feed-pumps, and piping, at the same price at which they provided similar equipment for the first boiler-house there—viz., £140,282.

LOCAL AUTHORITIES AND HOUSING.

THE IDEAL COTTAGE HOME.

At the Royal Institute of British Architects on Monday Mr. Raymond Unwin gave his idea of what was desirable in a cottage. The living-room should be large, with a comfortable fireside, the range should have a side light, preferably from the cook's left hand; there should be a table and cupboards convenient for use with the range. The room should be well lighted. There should be as few doors as possible, and they should open so that the least valuable part inside the room need be used for passage space. For furniture there must be the meal table and seats, the fireside chairs, the second table, and the dresser; the couch for resting and the desk or piano had also frequently to find a place. This room, if possible, should have a south-east window, and in every case must have some sunny aspect. It might be supplemented by a parlour, or relieved of some kitchen functions by the scullery, but it remained in all types of cottage the room in which the family mainly lived.

Exeter City Council and Town Planning Committee recommend the erection of 300 houses.

Warmley Rural District Council have decided to proceed at once with a housing scheme.

Penarth Urban District Council will proceed with a scheme for the erection of thirty workmen's cottages.

The Housing Committee of the Dudley Town Council recommend that a scheme be prepared for the erection of 120 houses at Red Hill.

Rugby Rural District Council have decided to proceed with a scheme for building 500 houses in their area. Fifty of these will be erected at New Bilton.

Hailsham Rural District Council have agreed to proceed with the preparation of a housing scheme, and have delegated full powers to act to the Housing Committee.

Nottingham Town Council on Monday last adopted the report of the Housing Committee, recommending the provision of at least 1,000 working-class dwellings.

The medical superintendent officer of health for Belfast, in a report to the corporation, says he estimates that 10,000 new houses will be required in the city and suburbs.

Thakeham Rural District Council have resolved upon the erection of 150 houses, and have delegated their powers to the Housing Committee to facilitate and expedite the scheme.

Willesden Urban District Council have approved a housing scheme for 1,000 working-class dwellings, to be erected on 34 acres of land at Twyford Abbey, and 58 acres at Neasden.

Southwick Urban District Council have informed the Local Government Board that they are providing a scheme for fifty houses, and that sites have been selected but not yet secured.

Blofield Rural District Council have instructed the clerk and the sanitary inspector (Mr. Claude King) to prepare a scheme for 143 cottages for submission to the Local Government Board.

FOR OTHER ADVERTISEMENTS

See End of Paper.

DEWSBURY UNION.

APPOINTMENT OF VALUER.

The Guardians of the Dewsbury Union invite applications from competent persons to Survey and Value new and altered property in the several parishes contained in the Union, and generally to carry out the duties prescribed, a copy of which may be obtained by sending a stamped addressed foolscap envelope to the undersigned. The remuneration to be a fixed annual sum (payable quarterly) for carrying out the work, and the appointment renewable from year to year, at the option of the Guardians, by an Annual Contract.

Persons desirous of Contracting must send written application, showing experience and qualifications, accompanied by testimonials of recent date, and stating the total annual sum they will require for carrying out the work, to the undersigned not later than 10 a.m. on Wednesday, the 1st proximo, and those selected will receive due notice of the day of appointment.

Canvassing the Guardians will disqualify.

C. P. PICKERSGILL,
Clerk to the Guardians.

Union Offices,
Wellington-street, Dewsbury.
December 20, 1918. (3,976)

PERSONAL.

Mr. W. Plant, borough engineer of Stafford, has had his salary increased to £750 a year.

Mr. F. W. Bricknell, city engineer of Hull, has had his salary increased from £750 to £1,000 a year.

Mr. G. Green, borough engineer of Wolverhampton, has had his salary increased from £600 to £800 a year.

Mr. Thomas Wilson, assistant county surveyor of Monaghan, has had his salary increased from £190 to £200 a year.

Mr. E. W. Pullen, of St. Albans, district surveyor to the Herts County Council, has been elected an associate member of the Institution of Civil Engineers, subsequent to passing the qualifying examination in October last.

Sir Auckland Geddes, President of the Local Government Board, has consented to become a vice-president of the London "Safety First" Council. Among the new members of the same body is Mr. Joseph Bowen, borough engineer of Wimbledon.

Mr. J. T. Shield, deputy borough engineer of Blackburn, has been granted an honorarium of £250 for his services as acting borough engineer between the date of the resignation of the late borough engineer, Mr. Race, and the appointment of the present borough engineer, Mr. Gooseman.

Mr. Jas. Jackson, superintendent of the City of Birmingham Salvage Department, has been awarded the Saxon Snell Prize of the Royal Sanitary Institute—which carries with it an honorarium of fifty guineas and a medal—for his essay on "Suggestions for Improvements in Apparatus and Appliances for Dealing with House Refuse."

OBITUARY.

MR. LOGAN WALLER PAGE.

British highway engineers will learn with deep regret of the death, which occurred last week, of Mr. Logan Waller Page, director of the United States Office of Public Roads and Rural Engineering. Mr. Page was a cousin of the ex-United States Ambassador, and it was his relationship to that gentleman that was responsible for the erroneous announcement by several news agencies of the passing of Dr. Page. Mr. Page was born at Richmond, Va., in 1870. He was educated at Powder Point School, Bear Island Academy, the Virginia Polytechnic Institute, and Harvard University. He was geologist of the Massachusetts Highway Commission and director of the testing laboratory of the Lawrence Scientific School of Harvard University from 1893 to 1900, and chief of the Division of Tests of the Department of Agriculture from 1900 to 1905, when he was appointed director of the Office of Public Works. He had served in that capacity continuously since that time. At the time of his death he was chairman of the United States Highways Council. He was a member of the American Society of Civil Engineers, and of the American Society for Testing Materials, and served for a number of years as president of the American Association for Highway Improvement.

THE LATE
MR. LOGAN WALLER PAGE.

Mr. R. W. Burton, surveyor to the Dunmow Rural District Council, has received official information that his son, Staff-Sergeant Thomas Burton, R.A.M.C., died from pneumonia at Salonika on November 29th. Sergeant Burton, who was twenty-seven years of age, and single, was, before he joined the Sanitary Corps of the Army, assistant surveyor and sanitary inspector to the Dunmow Rural District Council. Mr. Burton has lost three sons in the war.

Slump in Horse Prices.—There was remarkable decline in prices of horses at an auction sale at Ormskirk, on Friday last, of 100 horses from the Army Remount Depot, Lathom Park. The total realised a little over £2,000, an average of £20 per head, which represents a fall of between £20 and £30 compared with prices before the armistice was signed. Many useful horses were sold as low as £10 apiece.

Central Building Industry Committee.—At the last meeting of the council of the Institution of Municipal Engineers the secretary reported that he had written to the Ministry of Reconstruction with reference to the composition of this committee, pointing out the fact that municipal engineering was entirely unrepresented. He was instructed now to write and press for the appointment of at least two representatives of the municipal engineering profession.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

ASSISTANT SURVEYOR. — December 31st. — Wellingborough Urban District Council.—Mr. R. Stevenson Henshaw, engineer and surveyor, Council Offices, Market-square, Wellingborough, Northants.

SURVEYOR.—January 1st.—Uxbridge Rural District Council. £250 a year.—Mr. A. R. Woodbridge, clerk, 38 High-street, Uxbridge, Middlesex.

SEWAGE WORKS MANAGER.—January 1st.—Enfield Urban District Council.—Mr. T. W. Scott, clerk, Public Offices, Enfield, Middlesex.

SANITARY AND HIGHWAY SURVEYOR.—January 1st.—Uxbridge Rural District Council. £250 a year.—Mr. Algn. R. Woodbridge, clerk, Council Offices, 38 High-street, Uxbridge, Middlesex.

ARCHITECT.—January 6th.—Aberdare Urban District Council. £450 a year.—Mr. W. R. Morgan, clerk, Town Hall, Aberdare.

SURVEYOR.—January 31st.—Romford Urban District Council. £335 a year, with war bonus of £35.—Mr. Charles T. King, clerk, Council Offices, Romford, Essex.

CHIEF ENGINEER.—February 1st.—Metropolitan Water Board. £2,500 a year.—Mr. A. B. Pilling, clerk, 2 South-place, Finsbury-pavement, London, E.C. 2.

STEAM ROLLER DRIVER.—Aylesbury Rural District Council.—Mr. R. T. Stewart, surveyor, 21 Walton-street, Aylesbury.

MUNICIPAL COMPETITIONS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

BLAENAVON.—January 1st.—The urban council invite designs showing the lay-out of an area 18 acres in extent, for the erection of 140 houses. Premiums, £100 and £50.—Mr. J. Morgan, surveyor, Blaenavon, Mon.

BIRMINGHAM.—The Housing and Town-planning Committee invite designs for laying out an estate of 54 acres, together with designs for houses. Premiums, £150, £100 and £50.—The Town Clerk, Council House, Birmingham.

MUNICIPAL CONTRACTS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

Buildings.

MERTHYR.—December 31st.—For the erection of thirty-four cottages.—The Borough Architect, Town Hall, Merthyr.

Roads.

SOMERSET.—December 27th.—For surface-tarring on main roads in various parts of the county during the coming summer.—Mr. Gordon R. Folland, acting county surveyor, County Surveyor's Office, Wells, Somerset.

HENDON.—January 6th.—For about 142 yds. of 6-in. drain, 7 ft. deep, about 80 yds. super. limestone tar-paving laid on clinker foundation, and other incidental works.—Mr. S. Slater Grimley, engineer, Urban Council Offices, Hendon, Middlesex.

HERTS.—January 15th.—For the supply of broken granite, slag and tar macadam.—Mr. J. S. Killick, county surveyor, Hatfield, Herts.

Sanitary.

JOHANNESBURG.—January 8th.—For the supply of 5,000 sanitary pails with eyelet holes, and 5,000 lids for same.—Inquiry Office, Department of Overseas Trade (Development and Intelligence), 73 Basinghall-street, E.C. 2.

DUNDEE.—For the supply of 3,500 yds. of fireclay sewer pipes, and 60,000 common red bricks.—Mr. Jas. Thomson, city engineer, 91 Commercial-street, Dundee.

Stores.

HORNSEY.—January 6th.—For the supply of cartage, paving, granite, Portland cement, general stores and ironmongery, disinfectants and bituminous road materials.—Mr. E. J. Lovegrove, borough engineer and surveyor, Town Hall, Southwood-lane, Highgate, N. 6.

ST. PANCRAS.—January 6th.—For the removal of road sweepings and gully soil, horsing water vans, horsing road sweeping and other machines, cartage, Yorkshire stone and artificial paving slabs, granite kerbs, paving setts, broken granite and Kentish rag, gravel and other roadway materials, lime, cement, bricks, stoneware pipes and other glazed goods, pitch, tar, creosote oil, carbolic powder and coke.—Mr. W. Nisbet Blair, borough engineer and surveyor, Town Hall, St. Pancras-road, N. 1.

HENDON.—January 6th.—For the supply of about 10,000 tons of broken Clee Hill, Welsh, Leicestershire and other granite, limestone, gravel, shingle, sewage precipitant, hire of horses and carts, hire of steam roller, castings, ironmongery, and standard tar.—Mr. S. Slater Grimley, engineer and surveyor, Urban District Council, Hendon, Middlesex.

COMPETITIONS OPEN.

COMPETITION.

CITY OF BIRMINGHAM.

The Housing and Town Planning Committee invite Surveyors, Architects and others to submit Designs for Laying out an Estate of 54 acres, together with Designs for Houses, at Pineapple Farm and Fordhouse Farm, King's Heath and Stirchley.

Premiums of £150, £100 and £50 respectively will be awarded to the designs adjudged to be first, second and third in the order of merit.

The premiated designs will become the property of the Corporation.

Particulars may be obtained on or after the 1st January, 1919, on application to the Town Clerk, Council House, Birmingham.

Applications are to be accompanied by a deposit of 10s., which will be refunded on receipt of a design, or the return of the particulars within 14 days. (3,964)

APPOINTMENTS OPEN.

NORTHERN BOROUGH requires the services of a qualified Architectural Assistant, capable of taking charge of Housing Schemes under the supervision of the Borough Surveyor. Applicants should have had good practical experience in the preparation of plans, specifications, quantities and estimates, and possess a sound knowledge of building construction.—Application, stating age, qualifications, previous experience and salary required, to be sent, with copies of not more than three recent testimonials, by the 3rd January, 1919 (extended date), to Box 1,687, Offices of THE SURVEYOR, 24 Bride-lane, Fleet-street, E.C. 4. (3,975)

THE URBAN DISTRICT OF LITHERLAND invite applications for the appointment of Engineering Assistant in their Engineer and Surveyor's Department.

Applicants must be fully qualified Civil Engineers in possession of the Diploma of the Inst. C.E. or the Testamur of the Inst. Mun. and Co. E. Must have had experience in the works of Municipal Engineering. Good salary to competent man.

Applications, stating age, experience and salary required, accompanied by three testimonials, to be sent to the undersigned not later than Saturday, the 21st December, 1918.

WILLIAM H. ELCE,
Engineer and Surveyor.

Council Offices, Litherland. (3,949)

TO ENGINEERS AND SURVEYORS.

The Romford Urban District Council is desirous of appointing a Surveyor for their district. The salary offered is £335 per annum, rising by annual increments of £25 during the first three years, plus a war bonus of £35 per annum.

Applicants must have had previous experience of the duties of a Surveyor under the Public Health and other Acts, and be well acquainted with the provisions of such Acts.

The person appointed will be required to devote the whole of his time to the duties of the office, which will include all the duties usually required of a Surveyor under the several Acts which a Local Authority has to administer.

Applications must be made on forms which can be obtained at my office or will be forwarded on receipt of stamped addressed envelope, such applications to be accompanied by not more than three recent testimonials. The applications must reach me not later than the 31st January, 1919, endorsed "Surveyor."

Canvassing members will disqualify applicants.

No application will be considered from any person not having had previous experience.

The Council does not bind itself to make any appointment.

CHARLES T. KING,
Clerk.

Council Offices,
Romford.
December 6, 1918. (3,956)

WAR BONDS !

VICTORIA CONCRETE MIXERS

SAVE MONEY FOR WAR BONDS BY MIXING YOUR CONCRETE BETTER AND MORE CHEAPLY THAN IS POSSIBLE BY HAND.

No. O VICTORIA MIXER DISCHARGING.
Capacity, 6 cubic feet.

We supply many other sizes and styles suited to all classes of concrete and ferro-concrete work.

SEND FOR OUR CATALOGUE 7.

THE T. L. SMITH CO., 13 Victoria St., London, S.W. 1.

WRITE—ASTON MANOR, BIRMINGHAM.
WIRE — "YATONIAN, BIRMINGHAM."
'PHONE — EAST 400, 401 and 402
(Private Branch Exchange).

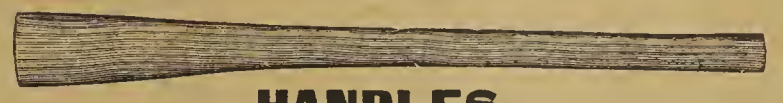
JOHN YATES
& CO., LTD.

ESTABLISHED 1804

HANDLED ROAD SCRAPERS.

PICKS OF ALL KINDS.

MATTOCKS.



HANDLES,
Crow Bars, Hurricane Lanterns, Shovels, Fencing Chain, &c.,
FROM STOCK.

KUREDAMP

"ALL BRITISH."

TRADE MARK
THREE SEAS BRAND

KUREDAMP is manufactured on an entirely new principle, quite different from all other paints.

KUREDAMP is supplied in thin transparent liquid form, and is applied like ordinary paint, with perfect preservative and waterproofing results, on **Iron, Stone, Wood, Plaster, Paper** or **Fabric,** sinking into the material, binding the whole together, and giving a **Hard, Elastic, Waterproof, Washable Surface.** Salt water and many acids have no effect on Kuredamp. It dries on tar. Damp or newly plastered walls can be painted or papered within six hours.

KUREDAMP, in addition to its damp-resisting qualities, is the most perfect combined **Thinner** and **Dryer** on the market, and when so used with white lead substitutes, or any stainers, the resulting paint is absolutely waterproof, weather-proof, and infinitely superior in every way to best lead paint. It is especially suitable for outside use.

KUREDAMP is supplied as a ready-mixed paint under the name of **Casson's "RIVERSEA" Paint.**

SOLE MANUFACTURERS— *Prices and particulars on application.*

THE CASSON COMPOSITIONS CO., LTD.,

11 CRAVEN HILL, PADDINGTON, LONDON, W. 2.

Proprietors of **CASSON'S WHITE** (THE PREMIER WHITE-LEAD SUBSTITUTE.)

Telephone: Paddington 3670. Telegrams: "Acascompos, London."

UXBRIDGE RURAL DISTRICT COUNCIL.

APPOINTMENT OF A SANITARY AND HIGHWAY SURVEYOR.

The above Council invite applications for the appointment of a Sanitary and Highway Surveyor for their District, which comprises six parishes.

Salary, £250 per annum, inclusive of all expenses except stationery and postage; but an office will be provided by the Council.

Candidates must hold either the Certificate of the Institution of Civil Engineers or of the Institute of the County and Municipal Engineers.

The person appointed will be required to devote his whole time to the duties of the office.

Applications, in the candidates' own handwriting, stating age and previous experience, accompanied by three recent testimonials, to be sent to me on or before Wednesday, the 1st day of January, 1919.

Notices will be sent to any candidate required to attend before the Council.

Canvassing, directly or indirectly, is prohibited.

ALGN. R. WOODBRIDGE,
Clerk.

Council Offices,
38 High-street, Uxbridge.
December 14, 1918. (3,968)

CITY OF BIRMINGHAM.

Applications are invited for the position of Temporary Surveying and Architectural Draughtsman for the Housing and Town Planning Department.

Candidates must have had previous experience in the laying-out of large estates, being accurate and expeditious levellers and surveyors, and good draughtsmen. Salary £3 10s. per week.

Applications, stating age, experience, present employment, and accompanied by three recent testimonials, should reach me without delay.

HENRY E. STILGOE, M.INST.C.E.,
Engineer and Surveyor.

Council House,
Birmingham. (3,965)

URBAN DISTRICT COUNCIL OF ENFIELD.

SEWAGE WORKS MANAGER.

The Council invite applications for the appointment of a Sewage Works Manager at Cuckoo Hall Farm, Lower Edmonton, from persons of experience in Sewage Disposal Works, and with a knowledge of Farming.

The person appointed will be required to live on the Farm, and will be provided with house, coal, and light free.

Applications, in candidates' own handwriting, stating age, salary required, past experience, and present occupation, accompanied by copies only of not more than three recent testimonials, to be sent in to me before noon on Wednesday, the 1st January, 1919, endorsed "Sewage Works Manager."

By order,

T. W. SCOTT,
Clerk to the Council.

Public Offices,
Enfield, Middlesex.
December 16, 1918. (3,969)

Premiums £3,487,074

THE LONDON & LANCASHIRE FIRE INSURANCE COMPANY LTD.

Reserves £4,078,996

FIRE.
Consequential Loss.
ACCIDENTS.
BURGLARY MOTOR CARS
EMPLOYERS' LIABILITY.
MARINE.
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TRIALS OF A TRANSPORT MANAGER.

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The Surveyor

And Municipal and County Engineer.

Vol. LIV. DECEMBER 27, 1918. No. 1,406.

Minutes of Proceedings.

By-law Reform (II.). In returning this week to the important report of the Local Government Board's Departmental Committee on Building By-laws, we would refer in the first place to that part of it which deals with the several existing methods of building control. There is a widespread impression that the only method by which building work is controlled is by by-law, and this erroneous belief is responsible for a good deal of the ill-informed criticism of the past few years. In what other ways, then, is control exercised over the erection of buildings? The answer is threefold. In the first place, certain matters, such as the connection of house drains to sewers, are the subject of "regulations." Again, other matters, of which the prohibition of back-to-back houses is an example, are the subject of direct statutory provisions. Finally, there are things which are left to the discretion of local authorities, such, for instance, as the maintenance of building lines under the Public Health (Buildings in Streets) Act. All this is very confusing to the plain man, and it is in the main the result of the haphazard system by which the existing body of Public Health legislation has been built up. There is much to be said, therefore, for the recommendation of the committee that so far as possible by-laws should be recognised as the standard method, and that any of the matters now regulated otherwise which are inherently capable of by-law control should be transferred to by-laws. The third part of the report deals with the main part of the terms of reference, namely, the effect of existing by-laws, and of the by-law system upon building and development. While the committee have evidently kept an open mind throughout their inquiry, it speaks well for the past administration of by-laws that they confine their recommendations for reform to these principal matters. First, in order to secure the modernising of absolete codes, it is suggested that they should be automatically cancelled by certain prescribed dates, and that all by-laws in future should be made subject to periodical review. This proposal really amounts to an approval of the policy which has been adopted by the Local Government Board for some time past, and a proposal to place that policy on a definite statutory basis. Next, it is suggested that the principle of Sec. 44 of the Housing, Town Planning, &c. Act, 1909, should be made of general application. This section, it will be remembered, gives the Local Government Board a definite power to secure the revocation and amendment of obsolete by-laws, where they form an actual impediment to the building of houses for the working classes. This proposal of the committee, therefore, is directed to the same end as the first one; and if it is necessary to attack the vital question of obsolescence in both ways, there does not seem to be any objection in principle to this being done. Finally, with regard to interpretation, it is proposed that local authorities should be compelled to state their reasons for the rejection of plans submitted to them; and further that the Local Government Board should be empowered to act as a tribunal for determining disputes as to the meaning of by-laws, leaving it, however, to the parties to seek redress in the courts unless they consent to the board's proposed jurisdiction. We hope that the moderate character of the committee's proposals will secure for them general support and early legislative approval.

* * * *

Heavy Motor Traffic (II.). Although the history of highway development in Great Britain demonstrates the general soundness of the principle that road construction should be adapted to new kinds of traffic rather than that new traffic should be subjected to regulations designed for the preservation of old-fashioned roads, it must be recognised that there are periods of transition when some form of traffic regulation is necessary. The fact that we are at present passing through such a period of transition owing to the rapid increase in the number and weight of mechanically-propelled vehicles is in itself ample justification for many of the recommendations of the Departmental Committee, to whose report we made reference last week. With regard to the weight, construction and speed of road locomotives, as distinguished from heavy motor cars, it will come as a relief to highway surveyors to find that no increase in the maximum weight is suggested, except in the case of the Boulton wheel traction engine, for which it is proposed that the weight might be raised from 14 to 18 tons. The committee have naturally devoted considerable attention to the important questions of tyre width and wheel diameter, and they recommend that the tyre of each wheel, whether steering wheel or driving wheel, should be at least 5 in. in width, and that subject to this minimum they should comply with the requirements of Sec. 28 (2) of the Highways and Locomotives (Amendment) Act, 1878. It is further proposed that a highway authority should be notified in advance of the passage over a road in its area of a traction engine hauling a wagon which carries a single article exceeding 16 tons in weight. Dealing with heavy motor cars, the committee point out that their regulation is more complicated and presents more difficulties than that of road locomotives on account of the rapid development in their use and the wide variations in their construction. This question, too, is one in which the general public has a much more direct interest as regards both the transport of goods and also motor omnibus services. The recommendations are concerned more particularly with the questions of weight, speed, diameter of wheel and width and material of tyre, and include an increase in the maximum unladen weight to 6 tons, or 8 tons including an unladen trailer. We shall deal with the remainder of the report, including the proposals for the restriction of heavy traffic on unsuitable roads, next week.

* * * *

Cottage Building and Red Tape. There has been so much exposure of bureaucratic methods lately that most people would be disposed to conclude that it would hardly be possible to add to our knowledge of the subject. It would, however, be erroneous to arrive at such a conclusion, if we are to credit the statement made in the *Architect* with respect to a proposal made to the authorities for the erection of cottages by a private individual. A certain architect, who, it seems, possessed both land and the inclination to build cottages upon it, proposed to erect workmen's dwellings, but was forbidden to do so. But the same controlling authorities responsible for the prohibition have granted permission to the local authority to erect cottages, which they want to do on the land of the architect. It is, of course, not surprising that he is not greatly inclined to sell his land under the circumstances, and, as he is quite willing to make his own bricks, a very interesting situation is created. It would seem to be a reasonable commentary that, given the need of the houses—and of this there is not the least doubt—it is surely preferable that a private owner should engage in a private speculation which supplies a public want than that a public authority should pledge its credit to do the same thing over the owner's head. It is not easy to escape from a conviction that in this instance the powers that be have exercised their authority in a manner quite contrary to sound public policy.

* * * *

Public Utility Societies. From correspondence we have received as to the position of public utility societies as providers of houses for the working classes, it appears that in certain quarters there is some doubt as to the exact status of these bodies. It may not be out of place, therefore, to remind our readers that public utility societies are fully recognised in existing housing legislation, being specially mentioned both in the Housing of the

Working Classes Act, 1890, and in the Housing, Town Planning, &c. Act, 1909. By Sec. 4 of the latter Act a public utility society is defined as meaning "a society registered under the Industrial and Provident Societies Act, 1893, or any amendment thereof, the rules whereof prohibit the payment of any interest or dividend at a rate exceeding 5 per cent per annum." By Sec. 67 of the Act of 1890 the Public Works Loans Commissioners are empowered to advance housing loans to such societies, when established "for the purpose of constructing or improving or of facilitating or encouraging the construction or improvement of dwellings for the working classes, or for trading or manufacturing purposes, in the course of whose business or in the discharge of whose duties persons of the working classes are employed." The period of these loans must not exceed forty years, and the amount must not exceed two-thirds of the value of the estate or interest of the society in the land or dwellings. It will thus be seen that for housing purposes a public utility society is, broadly speaking, in the nature of a company formed for the provision of dwellings which voluntarily imposes on itself a limitation of dividend. In the present state of housing, there is no doubt that the operations of such societies are capable of forming a valuable supplement to municipal schemes and building by private enterprise, although it is difficult to see how they can at present hope to earn a dividend approaching the 5 per cent allowed, if indeed, they can earn any dividend at all.

CORRESPONDENCE.

(One man does not see everything.)
—EURIPIDES.

TRAINING OF MUNICIPAL ENGINEERS.

To the Editor of THE SURVEYOR.

SIR,—The training of civil engineers has been under discussion in a desultory way for the last twenty years. I hardly think that much has been done to advance the subject since the issue of the report of the Institution of Civil Engineers in 1903.

A time has now been reached when, in the interests of national efficiency, civil engineers must put their house in order and make up their minds upon some general principles as to how their profession is to be entered. But, as Mr. Arthur E. Collins remarked at the recent meeting of the Institution of Municipal and County Engineers, the profession ought to be a closed profession, like those of medicine and law. There are difficulties in the way of this, but without closing the profession the abuses that now exist cannot all be remedied. Incidentally allow me to remark that it is a very serious thing, in view of any future reorganisation of municipal engineers, to find large numbers of persons who have not been trained as municipal engineers—who in many cases are not really engaged in anything that is more than on the fringe of civil engineering—admitted as full members of an institution of municipal engineers. I need hardly say I do not now refer to the Institution of Municipal and County Engineers.

The question as to the proper course for bringing a well-educated schoolboy to the position of a competent trained engineering assistant is of the deepest interest to anyone engaged in teaching in a university engineering school. I admit that it is hard to speak without seeming somewhat of a doctrinaire. Perhaps, then, I might be permitted to state my own experience before giving my views.

Leaving school at eighteen, I was an apprentice in Combe, Barbour and Combe's Foundry, Belfast (one year), student at Queen's University, Belfast (three years), research student at Birmingham University (one year), assistant to the late city engineer and to the present city engineer, Birmingham (four years), and Professor of Civil Engineering in Cork (twelve years). During this last period, in addition to examining a very large number of students for the Royal and National Universities, the Institution of Civil Engineers, the Civil Service Commissioners and other bodies, I have had a good deal to do with practical problems and work.

Anyone who honestly turns over his experiences can form a fair idea as to when and where his actions or steps were directed wisely or the reverse. Someone says engineering is the science of the second best; anyhow, it is quite certain that an ideal system of education is impossible, and any system is a compromise in which things here and there are sacrificed for other more desirable objects. My own conviction is that a boy going in for engineering should get the best possible general education up to about seventeen. This should include due attention to English (especially composition), mental arithmetic, geometrical and freehand drawing and French. I need hardly add that the general tone and direction of the school are of enormous importance, and boys should be made smart, alert, methodical, tidy and trained in the use of the hand and eye in every reasonable way. Next should come a three years' university course, terminating in a B.E. or B.Sc degree. Following this, the youth should enter an office and, provided that there is a good variety of work and that he is given opportunities of gaining knowledge of different things, he should at the end of two years be considered to have reached the standing of an assistant engineer. (It is needless to say he will go on learning till he shuffles off the mortal coil.) During his two years of training he ought to be paid, because he will be worth a small salary, unless he is below the general standard of young graduates.

It is a little beside the point to argue what the subjects in the three years' university course should be. There is a diversity of opinion as to details, and I do not want to enunciate any personal views in this letter. At another time I should be quite prepared and glad to deal at length with this aspect of the general question. Nor is it possible to discuss what the youth should do in his two years' practical training, for this depends upon the work in progress in the office he joins. I think, however, that there should be something to prevent the taking of pupils by such engineers as do not have any design or construction under their charge. There are excellent engineers in responsible posts who are not in a position to train assistants, because their work does not afford the necessary opportunities. If these men are underpaid, however, the tendency to supplement their incomes by pupils is one that it is difficult to resist.

Some engineers advocate a year or more practical work between school and the university. I had a year's such experience and can assure you that it is a great mistake. One loses his grip of his mathematics, and when a heavy university course is taken up this is a serious handicap. The undergraduate in such case is unable to cover the same ground or to acquire the same freedom and facility in mathematical calculations. There are advantages in serving some time on or in works before going to college, but they are not equal to the disadvantages.

The university graduate is very often misrepresented by both his friends and his enemies. The former want to represent him as an "engineer," the latter despise him as being useless at "practical work." The real truth is that, on the one hand, he has got only the preliminaries of his professional education, and, on the other hand, that when he secures the experience incidental to office, field or shop work, he will beat any other man, of equal natural ability, who has been trained solely by pupilage or apprenticeship. He will not be either a workmanlike or a speedy draughtsman on leaving college. He will, however, have a knowledge of what can be done on a drawing board in the way of making graphical calculations or of preparing labour-saving charts and diagrams, which the mere pupil cannot properly learn. He will also know the use of the newer surveying tools and, if he has been properly taught, he will handle a level, tacheometer or ordinary theodolite without fear of comparison with his fellows. I need hardly say that the general training in the kindred sciences, like physics, chemistry and geology, are essential if our future engineers are to face the problems that will confront them, with views of adequate breadth.

I have encroached sufficiently on your space without touching more than the fringe of the subject. Let me summarise my chief points:—

1. Civil engineering should be a closed profession.
2. The engineers of the future will be university graduates.
3 The best educational ladder is (*a*) school, (*b*) university, (*c*) training as assistant, (*d*) qualified engineering assistantship.

Please remember that I do not say one word derogatory to the thousands of men doing splendid work at miserably inadequate salaries who have never been near a college. These men are what they are by natural ability, industry and grit, and not because they enjoyed an ideal professional training. If they had had the larger opportunities now opening to the coming generation they would, in my opinion, have done greater things and have done them at less cost to themselves.—Yours, &c.,

C. W. L. ALEXANDER.

University College, Cork.
December 18, 1918.

INTERRUPTED STUDIES.

To the Editor of THE SURVEYOR.

SIR,—I was very pleased to see in your issue of November 1st last the question raised as to whether any concessions will be granted to young surveyors and engineers between the ages of twenty-one and twenty-five who, instead of studying for diplomas, have spent these last four years fighting. Many members of the profession now in France to whom I have spoken emphatically state that when returning to civilian life to recommence studying for diplomas, so hastily dropped, some concessions should be allowed them for the time spent with the forces.—Yours, &c.,

F. H. LAUD.

France.
December 15, 1918.

Economy in House Building.

SIMPLIFICATION OF CONSTRUCTION AND SANITARY ARRANGEMENTS.

The council of the Royal Sanitary Institute recently appointed a special committee, consisting of Sir Henry Tanner, F.R.I.B.A. (late Principal Architect to H.M. Office of Works); Mr. H. Percy Boulnois, M.INST.C.E. (late Engineering Inspector to the Local Government Board); Professor A. Bostock Hill, County Medical Officer of Health for Warwickshire; Mr. H. D. Searles-Wood, F.R.I.B.A.; and Mr. J. Osborne Smith, F.R.I.B.A., to consider any simplification of construction and sanitary arrangements of rural houses which would tend to reduce cost. The committee's report, which has been adopted by the council, has now been issued, and it appears that the committee found that so much of its report would apply equally to urban housing that it extended its observations to cover buildings of that description.

In the opinion of the committee, it is important, in order to secure good housing, that the number of houses to the acre should be limited. The committee proceed to observe that in laying out a building estate for houses of the character of those under consideration the arrangement of roads and footpaths and their construction are items which have a considerable bearing on the cost of the houses. The traffic upon them is usually light and infrequent, and a narrow road about 12 ft. wide is all that need be metalled, and there should be 5 ft. paths of gravel or tar-paving, separated from the roads by grass borders, making 40 ft. between the fences. Fences between the gardens can be largely dispensed with and privet used to indicate the boundaries. Economy is chiefly to be sought in the selection of the type of house and in the form of construction, though to some extent the cost may be affected by the by-laws of the local authority requiring the employment of unnecessarily expensive materials and involving excessive labour. The Local Government Board has drawn the attention of local authorities to the need of amending by-laws, and it is understood that those now in force are to be annulled and new by-laws substituted.

PLANNING AND ARRANGEMENT.

Standardisation is desirable within reasonable limits as a method of reducing cost. For instance, the same plan can be adopted for a large number of houses, with slight modification in the external design to prevent monotony, and also modifications to provide several degrees of accommodation.

Bricks, tiles, slates, piping, taps, baths, sinks, &c., are standardised, and it would be easy to extend such arrangements to items made of concrete, as steps of thresholds, window sills, &c.; also to door-frames and windows in which the sashes or casements might be of one size, there being one, two, three, or four lights. There might be several standard patterns of ranges and fireplaces.

Staircases.—The adoption of one-storey houses would avoid the necessity of staircases, incidentally leading to an economy of some 12½ per cent in the cube, and the consequent saving of wood in the stairs as well as joisting and boarding to the first floor. One-storey buildings, without reducing the area of the rooms, cover a very small additional area of ground, which can make practically no difference when the proposed number of houses to the acre is limited.

Bathroom.—The position of the bathroom is of importance as affecting cost. It should be as close as possible to the source of hot-water supply, and preferably on the ground floor in order to save a large amount of piping, and to avoid the use of pressure boilers, with the periodical expenditure for cleansing and repairs. If the bath is arranged on the upper floor a pressure boiler or geyser is needed to supply hot water, and a good deal of extra expense is entailed for fitting and maintenance. This should therefore be avoided as a measure of economy.

Water Closet.—This should, if possible, open off a well-ventilated back lobby, but where this cannot be arranged, it should open from outside, whether inside the house walls or in an outbuilding. The approach should be under cover and screened from observation.

Food Store.—This should be kept as far away as possible from the water closet or dust place, and be entered from the living-room or lobby, rather than from the scullery. A floor space of about 12 ft. is desirable. The window should face the north or east and extend to near the ceiling, and have inner fly-proof wire gauze and frame, and a ventilating opening near the floor similarly protected. The walls should be rendered smooth in cement and there should be shelves of slate or concrete, and the floor should be of granolithic.

MATERIALS AND CONSTRUCTION.

Timber Substitutes.—The short supply of timber and its excessive cost necessitates economy in its use, and the adoption of substitutes for which cement concrete, and steel can be largely employed.

Walls.—The adoption of any particular form of walling must depend largely upon the materials that can be obtained in the immediate neighbourhood. Where bricks are cheap, it is doubtful whether any other material can compete, but where sand and suitable aggregates are to be obtained, concrete blocks or slabs may prove to be cheaper. They require to be carefully made, and must be submitted to considerable pressure to be satisfactory. Generally it is more economical to obtain concrete slabs for walling from a factory where they can be made under pressure, and of uniform sizes, and supplied of superior make and more cheaply, although the cost of transport has to be added. This argument applies more particularly in the case of a few isolated cottages. A 9-in. brick wall cannot be depended upon to resist driving rain, and must in nearly all cases be rendered outside or rough-cast with cement and sand. Outside walls should be built in cement in the proportion of one of cement to six of sand, and the less exposed surfaces may be left uncovered. Stone walling is not usually so economical as brickwork.

Floors.—The ground floor should be of concrete not less than 4 in. thick, and the proportion may be one of cement, three of sand, and six of aggregate, and should be laid on 6 in. of hard, dry core of some kind, such as dry rubble, brick rubbish, or chalk. For the scullery, bath place, &c., the floor should be finished with 1½-in. granolithic. This, however, is not usually considered satisfactory for the living-room. For urban housing this room may be floored with some form of covering laid *in situ* on a waterproof mixture and composed of sawdust, cement, asbestos and magnesite, but great care should be taken to keep all metal away from this material. For rural houses this is hardly suitable, as it would be costly perhaps to lay, and certainly to repair. The better covering is probably some form of tile, laid on 2 in. of well-rolled tar paving in place of the concrete. The floor for an upper storey would in ordinary circumstances be of wood, and it is difficult to suggest any alternative which would effect economy even at the present price of timber. There should be a space about 5 ft. to 6 ft. wide at the back of the house paved with 3 in. to 4 in. of granolithic.

Roofs.—Should be so constructed as to protect the house as far as possible from variation outside temperatures. The pitch should be kept as flat as possible to economise timber. Slopes of 30 deg. are suitable for slates, asbestos slates, bituminous sheeting, or other similar covering. Tiles, however, require a pitch of 45 deg., or thereabout, and heavier woodwork, and are consequently more expensive. The lower pitch with either slates or asbestos slates is suggested. An alternative would be reinforced concrete. Dormer windows, valleys, and internal gutters are to be avoided, as they give rise to considerable expense. Bituminous sheeting and similar materials form good covering, but require attention, and have a shorter life.

Chimneys.—Flues need not be larger than 9 in. square; they should be carried up to at least 3 ft. above ridge, and the top flaunched to throw wet off. In exposed positions, the brickwork above the roof should be rendered or rough-cast in cement.

Windows.—The sashes should extend to within 6 in. of the ceilings, and to within 2 ft. 6 in. or 3 ft. of the floor. The glass area should not be less than one-sixth of that of the floor in the living-rooms, and not less than one-eighth in the bedrooms. Solid frames should be groved all round, built in, and the groves thoroughly filled in with cement mortar to form tongues. Casements should open outwards, and fanlights should be hung at the top. Double hung sashes have some advantages over casements for ventilation. All sashes should be made to open, and due regard be given to the cleaning of the glass.

Plastering.—Ordinary lime plastering with 10 per cent gauging of Portland cement, executed in two coats is better than any patent plastering, and is also cheaper. Patent plastering is hard, and the character of the surface favours condensation.

EQUIPMENT AND FITTINGS.

Wood Fittings.—Dressers can be omitted, but there should be shelves in the scullery, and also a cupboard with shelves and hooks. There should also be cupboards in the living-room, and in each bedroom; all should extend to the ceiling. Picture rails should be provided to prevent damage to the walls.

Sanitary Fittings.—The bath should be cast-iron, porcelain, enamelled inside. Economy may be effected in cost, floor space, and hot water by having it only 5 ft. long, which is

quite sufficient. An overflow and waste should be provided 1½-in. in diameter. The scullery sink should be of fireclay 10 in. deep, with lifting plug to waste. It is essential and also economical to provide all taps of good quality. The water-closet pan should be of fireclay not less than ⅜-in. thick, white inside. The seat should be of deal painted white, both top and underneath, or birch painted underneath and well oiled on top to prevent absorption, and should be hinged. The flushing cistern should be of simple construction, easily actuated, and of good quality. The use of the above fittings is only appropriate where there is a public water supply and drainage.

Hot Water Supply.—It is very desirable that a supply of hot water should be easily obtainable. It can be provided (1) by a portable washing copper or galvanised-iron boiler with draw-off tap; (2) by a range with washing copper attached, and (3) by a range with back boiler and hot-water storage tank. Nos. 1 and 2 are simple; the cold water should be supplied through a small cistern, with ballcock ensuring that the water is kept at a proper level in the boiler, and the hot water flows by gravitation into the bath. The height is not usually sufficient to supply hot water to a tap over the sink, therefore, for use at the sink, it has to be drawn off in a vessel. The advantage of No. 2 arrangement is that the fire may be either in the range or under the copper, whichever may be most convenient, while in No. 1 there is no alternative. The third system is necessary where hot water has to be supplied at levels above the range, and involves a pressure boiler and a circulating or storage tank, a considerable amount of piping and periodical attendance in cleaning out the boiler, and possible renewal both of the boiler and the adjacent pipes owing to the deposit of fur. On the ground of both initial and maintenance expense, this system is to be avoided if possible, and in a general way either No. 1 or 2 will be found to reasonably comply with all requirements, and preferably No. 2 owing to possible economy of fuel.

Cooking Stoves.—Where gas is available, a gas cooker can be placed in the scullery and a simple register stove with an oven and perhaps a small boiler installed in the living-room. This would be economical in the first instance and tend to economy in fuel. There is a probability that there may be a public supply of hot water within a comparatively short time produced by waste steam from concentrated electricity works, and that current will be supplied at much lower prices, including for power. This may also lead to the more general and economical use of electricity for cooking, and certainly for lighting in urban districts.

Water Supply.—Rain water collection and storage. Where there is a public supply of water, and the water does not exceed 15 deg. of hardness, storage of rain water is not required. When there is no such supply it is desirable to store rain water, which can be best done in a barrel not exceeding 40 gallons in capacity, which can be placed on brick or concrete supports, and if of sufficient height, can be connected with a tap over the sink. A draw-off tap towards the paved yard and a cover should be provided. Access should be easy so that it may be cleaned out at sufficiently frequent intervals.

WORKING CONDITIONS.

Disposal of Excreta, Rain and Waste Water.—(*a*) Where sewers are available: Under skilful advice manholes and traps can be largely dispensed with. The overflow from the rain-water butt and the rain pipes should discharge into shoes, without traps. Waste water from sinks, baths and lavatories should discharge into gullevs under the gratings, and one gullev should, if practicable, take several wastes. (*b*) Where isolated from sewers: Where there is no public scavenging nor system of water supply, earth closets should be installed and the contents dug into the land. Where there is a water supply, and arrangements can be made for emptying and cleansing cesspools these may be installed. Excreta from single or double cottages, or in large quantities as from groups of cottages having a plentiful supply of water, could be biologically treated, and the effluent passed into or upon the land or into a ditch, or temporarily retained in tanks upon allotments for use in dry weather. Waste water from sinks, baths, &c., under favourable conditions, could be passed through a rubble open filter into land drains or a ditch. Or where this is impracticable, could be stored in a cesspool in a garden or allotment, and pumped up for use on the surface. In districts where the conservancy system can be efficiently employed, suitable arrangements must be made for supplying dry earth and for the collection of pails, and, where there is land available, the waste water from sinks, baths &c., should be collected in an automatic flush tank and discharged in quantities of not less than 10 to 20 gallons at a time into sub-irrigation drains, constructed of agricultural pipes, laid in such a manner that the gradient can be maintained. It is essential that a sufficient quantity of waste water be discharged at each flush so as to make the water travel to the far end of the drains. Without a flush tank the water merely dribbles into the first few pipes and a nuisance is soon created.

Disposal of House Refuse.—The receptacle for temporary storage should be of galvanised iron with a tight-fitting lid, and should be frequently cleansed and dusted with carbolic powder or other disinfectant. House refuse if kept is a favourite breeding place for flies. House refuse contains some materials of value, such as tins, paper, cardboard, bones, bottles, rags, &c., which should, if possible, be separated and sold. The ashes should be screened, the larger pieces used as fuel. In localities where there is no systematised collection by the local authority the house refuse need not be stored, but some of it can be used as food for pigs and poultry, and what is of no use can be buried in the garden as manure. The paper and dry materials can be burnt or sold. Some local authorities recommend the householder to burn all they can in the kitchen fire in order to save cost of collection, but this appears to be a mistake under present circumstances and is sometimes difficult to accomplish, gas fires being used largely for cooking purposes, and these are not suitable for destroying refuse. The value of house refuse for pigs, poultry, manure, &c., is now being appreciated, and developments in this direction are being effected.

The Repair of Old Houses.—In many districts, especially in manufacturing areas, there is, at the present time, scarcely a habitable house of any size which is unoccupied, and the shortage of houses is so great that under any practical housing scheme the number of houses completed in each of the three following years will only make up the shortage and not leave a house vacant. To supply the ordinary "give and take" of people who require to move from one district to another, there ought always to be a certain percentage—say between 5 and 10 per cent—of houses unoccupied, so that it would be five or six years before it would be safe to demolish any of the existing houses. During the whole of this time temporary repairs must be done to old houses without entertaining the question of their condemnation. Speaking generally, as regards the rural districts of England as a whole, every house ought to be repaired and kept in as good condition as possible during the next ten years, because it will be impossible to build, except at a high price, and materials will, for all those years, be difficult to obtain. The only house condemnations which should be considered are those where the surrounding conditions make it impossible to keep them fit for occupation.

SEWAGE PURIFICATION IN THE WEST RIDING.

DUTIES OF LOCAL AUTHORITIES AND MANUFACTURERS.

The future policy of the West Riding Rivers' Board was outlined by the chairman, Major J. W. Dent, at the last meeting of that body

Major Dent said that, of course, during the war matters with regard to sewage purification, extension of sewage works and so forth had been very largely in abeyance. Now it was most essential—from the board's point of view, and he thought from the point of view of the country generally—that the work should once more be taken up to the full extent, and that the board should press those local authorities which had schemes already prepared to get on with the work at the earliest possible opportunity, and others that needed improvement to proceed to get schemes out. At the same time he would remind his manufacturing friends that they must put their houses in order as well. There were large schemes of reconstruction in one way or another in view, and no doubt a good many people might claim that other matters should take precedence of sewage disposal. But if there was a large development of housing and building, that meant still more sewage to dispose of, and it was better for everybody concerned if such matters were arranged for at the same time as the building was being proceeded with, instead of putting it off for months and causing a bigger expenditure in the long run and a great deal of pollution of the rivers, which was detrimental to the health of the public and often damaging to manufacturers. Therefore, when the board got its officials back and were able to take up the work, they would press not only those authorities who had schemes, but those who ought to have schemes, to carry out their duties. Manufacturers who had been allowed to let things slide during the past four years would have to sharpen up.

Women Public Health Officials.—In view of the probable establishment of a Ministry of Health, the Women Sanitary Inspectors' and Health Visitors' Association have written to the president of the Local Government Board, expressing the opinion that a more effective training and a higher status are required for women public health officials. The recommendations of the association include the payment of higher salaries, the granting of six weeks' annual leave, and the establishment of a Health Visitors' Examination Board.

LOCAL AUTHORITIES AND HOUSING.

LIVERPOOL'S BACK-TO-BACK DWELLINGS.

Liverpool Housing Committee, in their report of last year's operations, state that at least 1,000 houses per annum are needed to meet the increase of population, and that from 1911 to 1916 inclusive the estimated deficiency of working-class houses erected was approximately 6,000. It had been ascertained that the Liverpool and District Association of House Builders were prepared to undertake the provision of 9,000 houses in the period of three years following upon the war upon certain terms and conditions which had been furnished to the Local Government Board. The report points out that to complete the work of demolition of back-to-back houses, to which Liverpool has applied itself for many years, there remains approximately 2,585 houses still to be dealt with, and that 4,000 houses in an extremely insanitary condition call for immediate treatment.

THE COST OF BUILDING.

Maidenhead Town Council have passed a resolution affirming that, by reason of the serious difficulties, financial and otherwise, raised by the Local Government Board's circular of March 18th, they cannot see their way to commit the ratepayers to the liabilities involved. It is pointed out that, while the workpeople for whom houses should be provided are not able to afford a rent of more than 6s. or 7s. per week, the cost of the houses required by the Local Government Board would involve an annual charge of 12s. to 13s. per week at least.

Alfreton Urban District Council have adopted a scheme for the erection of 200 houses.

Worthing Town Council propose to submit to the Local Government Board a scheme for the erection of 200 houses.

Falmouth Town Council have informed the Local Government Board that they are prepared to erect about 100 houses.

Edinburgh City Council Housing Committee have agreed to set off part of Gorgie estate for the erection of working-class houses.

Newton Abbot Urban District Council are making application for compulsory powers for acquiring a site for houses at Buckland Brake.

Walsall Rural District Council propose to erect forty houses each at Rushall, Pelsall and Aldridge, twenty at Great Barr, and fourteen at Bentley.

Shrewsbury Town Council are promoting a scheme for 160 to 200 houses, on the basis of about ten houses to the acre, with space for a park.

Henley Urban District Council have informed the Local Government Board that they are prepared to make provision for about fifty houses.

Ongar Rural District Council are selecting suitable sites in the area for the 200 houses which they have expressed their readiness to provide.

South Mimms Rural District Council have instructed the surveyor, Mr. G. Simcox, to prepare housing plans on the basis of eight houses to the acre.

Shifnal Rural District Council propose to erect sixty-five houses when prices of material permit this to be done without the imposition of more than a penny rate.

Eastbourne Rural District Council have prepared a scheme for ninety-one houses in various parishes, and they are engaged in negotiating for the purchase of the necessary land.

Doncaster Town Council have decided to procced with the erection of about 380 houses at Carr House as soon as possible, and to prepare a scheme for about 370 houses in addition on two other sites, making in all 750 dwellings.

Penzance Town Council are conducting a quest with respect to two possible sites for working-class houses. It was stated at the council meeting last week that it will be necessary to provide at least 200 houses at a cost of between £50,000 and £60,000.

The Housing Committee of the Dublin Town Council have instructed the city architect to prepare at once plans for the erection of houses on open sites, commencing with the marine estate, and it has been also decided to communicate with the Government in the hope of obtaining definite information as to the amount of State aid which will be available for the solution of the housing problem in the city.

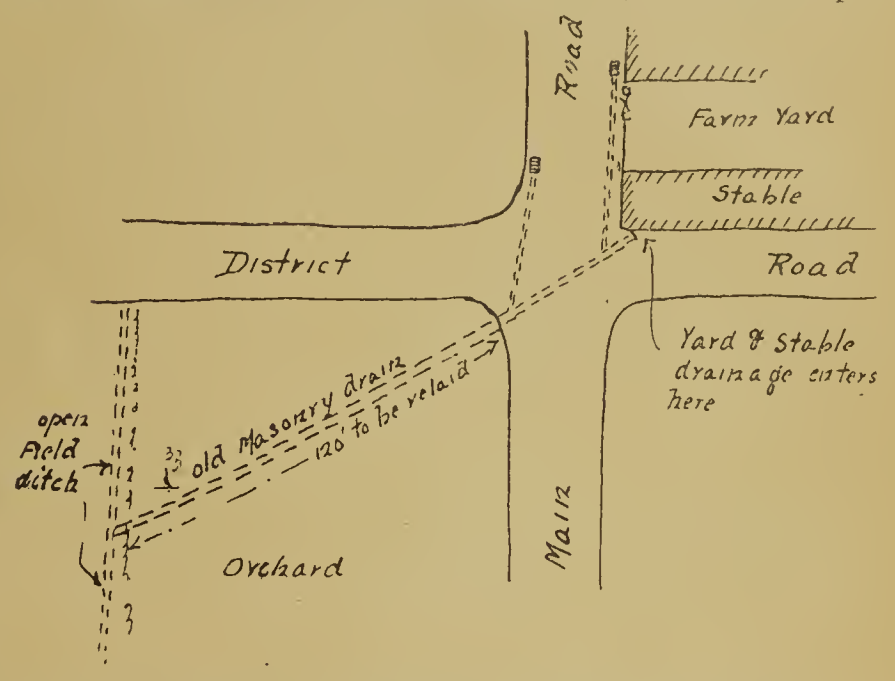
As a result of the interview of the surveyor, Mr. S. S. Gettings, with the Local Government Board officials, a committee of the Dorking Urban District Council recommend the erection of such houses as are necessary on the terms set out in the board's circular of March 18th. They also recommend that a scheme be prepared by the surveyor, and steps taken to acquire two sites, one to be available for fifty-five houses and the other for thirty-six houses, on the basis of twelve houses to the acre.

LAW QUERIES AND REPLIES.

Edited by J. B. REIGNIER CONDER,
A Solicitor of the Supreme Court.

In order to avoid confusion querists are requested to use distinctive words as noms de plume. *The letter* X, *combinations such as* X.Y.Z., *and words such as* "engineer" *and* "surveyor," *should never be used.*

DRAIN OR SEWER: REPAIR.—"Asaba" writes: A masonry arch drain serves for carrying main road-surface water and farmyard and stable drainage jointly. It has been broken and choked for a long while, and I had it taken up to avoid road damage during floods, and soakage damage to the orchard through which it passes. The farm and orchard belongs to the same estate, the agent for which I approached with a view to joint repairs—viz., relaying the drain with 12-in. common pipes. The agent, who is a solicitor and town clerk, suggests that this drain, owing to its combined use, is a sewer repar-



able by the council—his attitude being entirely friendly. The council have given me instructions to relay this drain, provided the estate will bear its share, which share might be anything from quarter to half the cost, according as we can agree on the ground. I attach sketch, and maintain that this drain is a joint affair. I have been unable to ascertain locally whether this drain was originally constructed to accommodate the stable and yard drainage or the main road surface-water, but was constructed some fifty years ago.

Unless, at the time of the passing of the Public Health Act, 1875, the drain was under the control of a highway authority, not being a local authority under that Act, it would, I think, come within the statutory definition of a "sewer." But if, at the time of the passing of the Local Government Act, 1888, it was a drain "belonging to the main road" within the meaning of sec. 11 (6) of that Act, it vested in the county council under that section, and in that case it would not become a "sewer," so as to be vested in the sanitary authority, merely because of an unauthorised connection with the yard and stable drainage. See *Rickaby* v. *New Forest Rural District Council* (26 T.L.R., 586).

ROADSIDE DITCH.—"Penywern" writes: A. is the owner of a field adjoining a public road, from which it is separated by a hedge and ditch. He proposes to remove the hedge and fill up the ditch and to erect a fence enclosing it as part of his land. Can he legally do so?

This depends upon whether or not the ditch is part of the highway. As between adjoining owners whose lands are separated by a hedge and ditch, there is a presumption of law that the ditch belongs to the owner of the hedge. But there is no such presumption in the case of a ditch alongside a highway. See *Chorley Corporation* v. *Nightingale* (23 T.L.R., 651). If the ditch in question was originally constructed for the passage of water, and has been used for highway purposes, I think it would probably be held to be part of the highway, and in that case the owner of the field cannot legally fill it up or enclose it.

OBSTRUCTION ON HIGHWAY: LANDSLIP.—"G. S. L." writes: A public road in this (rural) district passes through a deep cutting, the adjoining land being supported by a retaining wall. Owing to heavy rains causing a landslip, part of this wall and large quantities of soil have fallen on to the road, causing a dangerous obstruction. Can the owner of the land be compelled to remove it, and if so what proceedings should be taken? I have not been able to ascertain who built the wall originally, but the owner has repaired it on several occasions in recent years.

In my opinion the landowner can be compelled to remove the obstruction, or to pay the cost of its removal by the rural district council. Notice should be given to him to remove it, and if he fails to do so he can be summoned under Sec. 72 of the Highway Act, 1835, or the council can themselves remove the obstruction and recover the expense of so doing from him. See *Gully* v. *Smith* (53 L.J., M.C., 35); *Louth Urban District Council* v. *West* (60 J.P., 600).

Private Bill Legislation.—The 1919 Session in Parliament promises to be a busy one for private Bill legislation. December 17th was the last day for depositing petitions in respect of Bills to be proceeded with, and among the fifty-eight Bills were numerous notices relating to proposed municipal improvements.

PUBLIC SERVICE MOTOR VEHICLES.

HAULAGE WAGONS AND SWEEPERS IN HULL CITY ENGINEER'S DEPARTMENT.

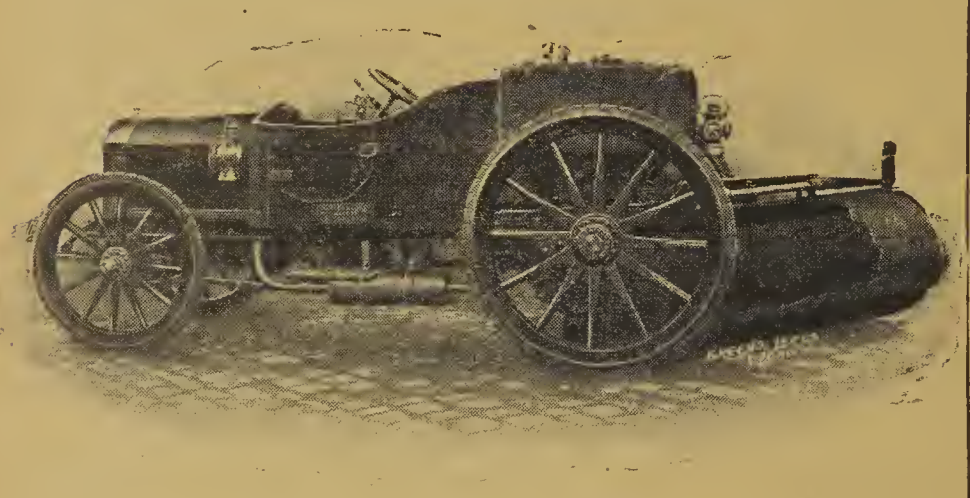
The conditions at Hull are somewhat exceptional in that the town is on a dead level, and the recognised load for one horse is 55 cwts. in a cart, or 65 cwts. in a rully. It is therefore only under special circumstances that mechanical vehicles can hope to compete with horse vehicles on ordinary town runs.

The corporation's first purchase of a mechanical vehicle was in 1909, when a 6-ton "Sentinel" wagon and trailer were acquired. Repeat orders were given, until in 1916, the corporation had five similar wagons, and the city engineer, Mr. F. W. Bricknell, thinks that this number of wagons will do all the work which can be economically performed by vehicles of such large capacity. "Given suitable conditions," says Mr. Bricknell, "that is, heavy roads, rapid loading and reasonably long runs, they show a very large saving over horse haulage; and under urban conditions the most important factor is rapid loading, and a wagon working from a wharf with a steam crane or with a gang of navvies will compete with horse traction on quite short runs."

The wagons have also been employed on special work, such as hauling a Whittome's collecting sweeper, hauling 1,200-gallon sprinkler vans and tar-spraying. One of the wagons is fitted with a weeks apparatus with a 1,000-gallon tank, which is filled with hot tar at the refinery, and the work of tar-spraying is got through by this means extremely expeditiously.

Nothing has been done with heavy petrol vehicles, but a 25-cwt. Thornycroft rully and an "Omnium" carrier are in use for the conveyance of tools, stores and light materials.

The enormous increase in the cost of horse haulage during the war and the difficulties in finding competent drivers of any kind have led the corporation to order a 3½-ton "Orwell"



Green's Motor Street Sweeper at Hull.

electric rully. The idea is that this type of vehicle can be handled by a man of the navvy type, who will not be afraid of the heavy work of loading, and that, apart from getting over labour difficulties, a financial saving may be effected on the long runs.

A variety of causes has led to the quantity of refuse produced on the streets becoming very small, and attention was directed to heavy horses bringing in loads of a few cwts. of sweepings. It is thought that a saving may be effected in this work so far as it lies near the depots, by using a small electric warehouse truck, and one of these vehicles is being ordered for the purpose. This is regarded purely as an experiment, and its success will depend on whether the driver can manipulate the vehicle from the ground at slow speed, so as to assist the picker up as a horse driver would do.

The corporation has two Green's motor sweepers, which no doubt effected a great economy on horse sweeping, but they have been working at a great disadvantage during the war, driver after driver having gone on active service, and the petrol supply being very restricted. These sweepers are fitted for gas, but the reduction of pressure due to fuel restrictions has involved such a loss of time in refilling that proper use cannot be made of the arrangement.

There are also two motor mowers which have given extremely satisfactory service.

In the collection of house refuse which is under the control of the chief sanitary inspector, no attempt has been made to supersede horse haulage.

LAMBETH'S MOTOR SWEEPERS.

Two Laffley motor sweepers were purchased in 1915 by the Lambeth Borough Council, and Mr. H. E. Anderson, the acting borough engineer, informs us that their adoption has effected a very considerable economy as compared with the sweeping by horse-drawn brooms which were formerly used.

PETROL RESTRICTIONS REMOVED.

The Board of Trade announces that the Motor Spirit Restriction Orders, the operation of which has been suspended until January 10th, will be revoked entirely as from that date. Licences to obtain motor spirit are issued under the Finance Act, 1916, and the licence system must therefore remain in force. The Petrol Control Department, however, is prepared to issue licences to new applicants, and to increase the quantities allocated to existing licence holders, and will endeavour as far as possible to meet all reasonable requirements.

DRIVING RULES.

In view of the recent relaxation of the petrol restrictions, the "Traffic Rules" compiled by the Commercial Motor Users Association some time ago, and approved by the Chief Commissioner of the Metropolitan Police, may be of interest to users of the highway. More than 100,000 of these driving rules have been supplied, free of charge, to local authorities in various parts of the country, by whom they have been distributed to drivers of motor vehicles applying for driving licences. In addition to setting out the ordinary rules of the road, a series of simple hand signals is given, by which drivers of vehicles can indicate intended changes of direction to those in charge of conveyances behind. A limited number of these rules are still available, and any driver or other interested person may receive a copy, post free, by applying to Captain F. G. Bristow, general secretary, the Commercial Motor Users Association, 83 Pall Mall, London, S.W. 1.

Hoddesdon Public Health Committee are considering the question of the provision of a motor ambulance.

Minehead and Williton (West) District Hospital Committee are asking for tenders for a motor ambulance.

The Austin Motor Company, Limited, Northfield, Birmingham, have a stock of their 2-3 ton lorries now released for unrestricted sale to ordinary purchasers.

The provision of a second motor fire engine has been raised by the Fire Brigade Sub-committee of Bath City Council, but, on the suggestion of the Mayor, the consideration of the matter has been postponed.

Richmond (Surrey) Town Council are advertising for the supply of two motor fire engines. Specifications and conditions of contract may be inspected and particulars obtained on application to Mr. J. H. Brierley, borough surveyor, Town Hall, Richmond, Surrey.

Bootle Town Council have resolved to establish a motor department to undertake the whole of the motor transport and cartage work, with the exception of the fire brigade. The matter will come under the administration of the Motor Vehicle and Carting Committee.

A gas traction section will be included in the British Scientific Products Exhibition to be opened at Manchester to-day, the 27th inst. The Automobile Association, in view of this, has extended the time for receiving entries for the £1,000 competition for the best method of using coal-gas as a motor-car propellant until January 31st. Entry forms may be obtained from the secretary of the association, Panton House, Whitcomb-street, London, E.C. 2.

Houses for Birmingham Drainage Board Employees.—At a meeting recently of the Birmingham Tame and Rea District Drainage Board it was reported that the Works Committee had given instructions to the engineer to prepare plans and obtain tenders for the erection of twelve cottages on land belonging to the board at Minworth Greaves, and a similar number of dwellings on a site facing Minworth Green. The tenders, nine in number, had been opened, but the lowest was so much in advance of the engineer's estimate that the committee were not prepared at present to recommend its acceptance. The action of the committee was approved, the chairman saying that no doubt the reason the lowest tender was so much higher than was estimated was due to the uncertain conditions of the labour market and the cost of raw materials.

The Supply of Gas.—Letters have been addressed by the Board of Trade to the Association of Municipal Corporations, the Urban District Councils Association, and the London County Council, stating that the Fuel Research Board are not yet able to report the result of their investigations into the most suitable quality and composition of gas, having regard to the purposes for which it is now used. The Board of Trade therefore suggest to local authorities responsible that they refrain for the present from taking proceedings against any of the gas undertakings in respect of deficiencies of calorific power, so long as the power does not fall below 450 B.Th. and so long as the proportion of inert constituents in the gas is not excessive. The suggestion is put forward solely as an emergency measure, to meet an abnormal situation likely to continue for the next few months.

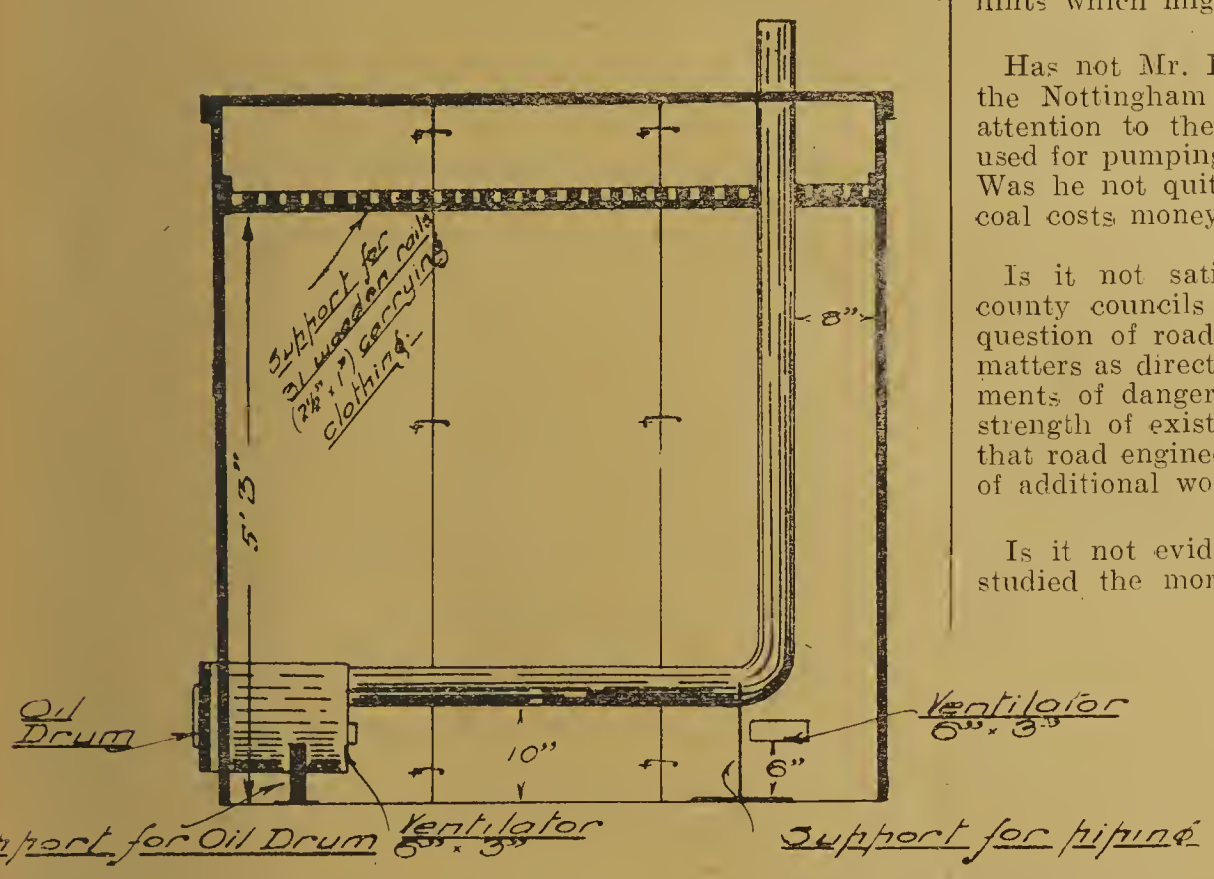
EXTERMINATION OF VERMIN.

A PORTABLE DISINFESTATION CHAMBER.

One of the greatest problems that the medical authorities responsible for the health of the troops overseas have had to tackle during the war has been the extermination of lice from the clothing and blankets of the men. Numerous disinfestation chambers, capable of dealing with large quantities of clothing, have been erected by the British Army overseas; many of these are large and costly structures, and, while numbers of troops were located within a short distance of these chambers, they served their purpose well. In addition to these, every Division has a Foden-Thresh steam disinfector which does admirable work, and is usually very reliable, a temperature of 220 deg. Fahr. being attained and maintained without difficulty.

The rapid movement of troops from one area to another during the past few months has demonstrated the fact that stationary delousing chambers were of little use at such a time, but that it was very desirable that every unit of any size should be provided with a portable disinfestation chamber, which could be erected in a few minutes, was simple in construction, could be carried on a box-car, Ford ambulance car, or G.S. wagon, and made in sections, no section being heavier than a man could carry.

The Commanding Officer of a Sanitary Section, Captain E. R. Matthews, S.S.O., R.A.M.C. (T.), was instructed to design and erect a chamber that would meet these requirements, and, with the aid of four of his N.C.O.'s, three of whom are excellent joiners, and one a tinsmith, he produced the



Section of Matthews' Portable Hot-air Disinfestation Chamber.

chamber here described. Several of these chambers have already been erected and answer their purpose well.

The disinfestation chamber is 6 ft. by 6 ft. in plan, and from 6 ft. to 6 ft. 6 in. in height; it is built up almost entirely of 2½-in. by 1-in. timber, the roof being strengthened by the addition of 4-in. by 1-in. It is built in sections, which fit together like shutters covering a shop window, except that each section is dowelled into the next with an iron dowel. It is lined inside and out with tin, and in one case light (22 gauge) corrugated sheets were used. Tins are usually obtained without difficulty from the ration dump.

As to the heating of the chamber, this was done by means of the insertion of a stove, made out of a Cresol drum, and so fixed that it is fed from the outside, which is a great advantage over the inside feeding stove. A stove pipe is carried across this hut and up through the roof, the piping being obtained from the R.E. dump. The roof is formed in two parts, and may be put on or taken off in one minute. Racks have been inserted from which clothing and blankets may be suspended, and ventilators have been put in with sliding doors, so that the temperature may be easily regulated. Bolts with thumb-screws assist in holding together the corners.

The following is the result of the test made by the Officer Commanding: Time taken to erect, four and a half minutes; time taken to take down, two minutes; temperature obtained in ten minutes, 65 deg. C.; temperature obtained in fifteen minutes, 80 deg. C.

These temperatures (although the ground was wet) were obtained without difficulty with a wood fire, as coal or coke could not be obtained.

It should be noted that no materials used in the erection of this chamber were of an unusual character, but only those that could easily be obtained by any unit desirous of erecting a similar chamber.

It is estimated that sixty blankets can be deloused at one time. A temperature of 53 deg. C. will kill lice, and 55 deg. C. nits, and if the articles for disinfestation remain in the chamber for twenty minutes at, say, a temperature of 60 deg. C. that is sufficient. This chamber can be recharged ten times per day, so that 600 blankets per day can be dealt with, or six times that number of articles of underclothing.

In some of the C.C.S.'s overseas two of these chambers are being erected. The total weight of the whole structure is only 4½ cwt.

THINGS ONE WOULD LIKE TO KNOW.

(Contributed.)

Is it at all surprising to learn that the combined labour of 270 conscientious objectors engaged on the construction of the Newhaven-Seaford road was found to be equivalent to that of about thirty ordinary men?

* * * *

Would not a book on war-time engineering problems and experiences provide some interesting reading? Would not also the makeshifts that have been resorted to in connection with sanitation in the field, if set forth in detail, give us hints which might prove invaluable if carefully studied?

* * * *

Has not Mr. F. W. Davies, the engineer and manager of the Nottingham Corporation waterworks, done well to call attention to the enormous increase in the amount of coal used for pumping owing to the waste of water by consumers? Was he not quite right in saying, "Water means coal, and coal costs money; wasting water at any time is wicked"?

* * * *

Is it not satisfactory to hear that a large number of county councils are giving due attention to the important question of road transport and are already considering such matters as direction of routes, diversions, widenings, improvements of dangerous corners, reduction in gradients and the strength of existing roads? Does not this alone go to show that road engineers are likely to be faced with a vast amount of additional work in the near future?

* * * *

Is it not evident that the more the question of roads is studied the more are we impressed with the necessity for proper drainage of the whole structure of the carriageway? Is not this question of drainage inseparably attached to the artificial foundation which in nearly all cases, depending on the construction of the road surface, should be so carried out that it will not hold up the water but allow it to drain through both vertically and horizontally? Has it not been found over and over again that the real cause of many a bad road has been the want of this drainage?

* * * *

Is it surprising to find that excessive damage is done to roads by the haulage of timber when we read that Mr. W. Hunter, surveyor to the Helmsley Rural District Council, found recently that one load of 7 tons was carried on a vehicle the wheel tyres of which measured only 4½ in. in width? Assuming that at least three-quarters of the weight came on the back axle, which is more than likely on a timber carriage, does not this give a dead weight of 1,307 lb. per inch width of tyre? Is it not rather astonishing that any ordinary road can be found to stand up against such a punishing traffic?

* * * *

Is it not as well that the Metropolitan Police are stirring in the matter of the want of uniformity in the methods adopted for the lighting of temporary obstructions in the streets whilst repairs, trenches for various purposes, and similar works are in progress? Would it not help to improve matters if the lamps were always red, placed at a uniform height and at certain fixed distances apart so that drivers of vehicles could at once estimate with some degree of accuracy the length and width of the obstruction and take measures accordingly? Did not the "Safety First" Council pass some resolutions on this subject some time ago?

Superannuation.—Holme Cultram Urban District Council have passed a resolution approving the principle of a superannuation fund for local government officials.

The Disposal of Sludge.

By F. T. HAMBLETON, Newcastle-under-Lyme.

[*Concluded from last week.*]

If some suitable apparatus or plant could be devised there is no doubt that certain sludges could be disposed of by destructive distillation, and this method I am sure has not received the amount of time and thought due to it.

The gas produced could be utilised either for power or lighting on the works on which the sludge is produced, or elsewhere.

The liquor and residues could be disposed of in perhaps some variation of the way of coal products. I think the above is within the range of possibility.

In 1912, when I tried an experiment, I succeeded in getting quite a good light and heat from the gas so obtained, and with reliable assistance the following figures were obtained:—

Gas	10,640 cub. ft. per ton
Residue	1.050 lb. per ton
Candle power	20·5
Calorific value	603 B.T.U.
Volatile residue	53·12 per cent
Non-volatile residue	46·88 per cent

Twelve cwts. of air-dried sludge were afterwards tried and four inclined gasworks retorts were charged with 3 cwt. each in the same way as they would be with coal.

The actual amount of gas produced was 5,570 cub. ft. or 9,283 cub. ft. per ton, which came off at the following rate:—

1st hour	1,110 cub. ft.
2nd hour	1,020 cub. ft.
3rd hour	980 cub. ft.
4th hour	840 cub. ft.
5th hour	700 cub. ft.
6th hour	560 cub. ft.
7th hour	360 cub. ft.

Gas was still being driven off, but only in small quantity.

By further experiments it was found that if the sludge was mixed with coal (slack) the illuminating power, calorific power and volume of gas were slightly increased above those obtained from coal alone.

If illuminating power was the chief thing aimed at it is better to use sludge by itself and heat at a lower temperature.

There are tar and ammoniacal liquor produced, which no doubt could be treated further, as the products of these substances are in great demand at the present time.

A fine dust was the form of the residue left in the retorts, and while this may prove detrimental to coke from coal if sludge and coal were mixed, it contains phosphates and silicates, and when used as a dressing on grass it gave very good results. The dust also suited small seeds. Therefore it could be used as a fertiliser.

Sludge if in a suitable state can be disposed of by burning, but unless the heat produced is utilised (and in view of the above figures) it seems absurd to let the chief and useful products burn away to waste. An objection to burning is that a most disagreeable odour is given off.

DRYING SLUDGE.

This is one of the greatest difficulties where sludge cannot be got rid of in liquid form, and various methods have been tried to eliminate the moisture such as air-drying, pressing, vacuum and heat.

Drying by Air.—Drying by air is generally carried out in prepared beds or lagoons, and the adoption and success of this method depend upon the situation and circumstances of the works. I have tried various methods of air-drying, but none has been a complete success. The method seems to be too indefinite and uncontrollable owing to the effect of weather.

Three prepared beds of broken brick and coarse clinker covered with a layer of clinker of finer grade were tried; each bed was under-drained by land drains, and the liquid re-entered the tanks for further treatment. The walls were solid, and each bed was used alternately. I have also tried covering the clinker over with a layer of bracken and stable litter. These gave fair results, but were affected by the weather.

On a small scale liquid sludge was poured direct on to special tiles of the same pattern as are used in malt kilns. It is a 12-in. sq. tile, 2 in. thick, containing 476 holes $\frac{1}{8}$ in. diameter on the face. These holes are arranged in clusters of seven, $\frac{1}{2}$ in. apart, and are $\frac{5}{8}$ in. deep, each cluster opening out into a $1\frac{1}{8}$ in. circular hole at the back. The result obtained from this was good, and better than expected. The liquid was much clearer than one would suppose, but there is a danger of the holes becoming stopped.

Trenching the land and filling the trench with sludge has been tried, but requires more trouble and labour than the method we adopt of applying the sludge in liquid form.

The best bed, or one that gave the best results, was constructed, walls and floor, of house refuse and ashes. The water drained through and on to the land set with crops. The sludge dried more quickly, and when dry the ashes and sludge help to lighten stiff land. This method should be suitable if there was a destructor in the neighbourhood, for then both sludge and refuse could be burned together and the heat utilised.

Pressing is a more definite and controllable means of expelling a certain amount of moisture, but there is the cost of machinery and additional lime to be considered, and after pressing there still remains a good percentage of moisture in the pressed cake. If there is very little land available, this method generally has to be adopted regardless of cost to reduce the bulk. If some effective use could be found for the pressed cake, then the cost of pressing would be more than warranted.

Heat.—Drying by heat is the most definite method and easily controllable, although rather difficult and costly, but the cost of drying by this means would greatly depend upon the circumstances. For instance, if waste steam or other waste sources of heat could be utilised, then the cost would be considerably less than if a special plant had to be laid down for the purpose.

Vacuum.—I have had no experience in this method of drying, but I have often wondered if it would be suitable and pay for the trouble to have specially constructed pans, or enclosed ovens, with an exhauster attached, in which the internal pressure could be greatly reduced, or a partial vacuum created. The moisture then should be evaporated at a far less temperature.

There is no doubt that the problem of drying is almost as difficult a problem as the disposal; the two go together, and if we find a quick and sure method of drying, then we are a good distance on the road towards disposing of the sludge.

SUMMARY.

In summing up the foregoing, the following points stand out in this troublesome but greatly interesting question of disposal of sludge:—

The composition of the sludge to be dealt with should be ascertained and any special feature noted.

There may be certain constituents that would pay for extraction—*e.g.*, grease, fibre or other substances.

The sludge, if dry, may be used for fuel, gas production, or for manure; if not of sufficient value in itself, it may pay to add certain materials or chemicals, and thus clear the cost of disposal.

If the sludge is applied to land it should be done methodically and not haphazard. We should not simply dump it on to the land, but apply it in the most suitable manner. In this way only shall we get a good production of crops which will more than pay the cost of disposal.

Finally, I think we are a little too reserved, too apt to follow someone else's lead, to apt to move in a mass. I think it would be better if we would give and ask for any information required, and then act a little more individually and try to think out a method suitable to our requirements. and if a suitable and profitable means is adopted, give others the benefit of the experience. It is with this thought that I have written this paper, without any expert knowledge of chemistry, engineering, &c, in the hope that there may be some little thing that I may have found in practice that another may combine with theory and thus lead to discovering a suitable and profitable method of successfully dealing with the sludge. If this is found, then we shall extract all the more solid matter from our sewage, and incidentally more successfully deal with our sewage and have far less trouble with the effluents.

Tar Control Suspended.—The Minister of Munitions has suspended until further notice the Tar (Coal and Water Gas) Order, 1917, which controlled coal tar and water gas tar.

Crystal Palace Engineering Society.—The "Wilson Premium," for the best paper read before this society during the past session, has been awarded to Mr. W. G. S. Grimmond, for his paper on "Theory and Practice of Present-day Radio-telegraphy." Other papers read during the session were "The Elimination of Faults in Power Units," by Mr. E. A. Boyd, and "The Development of the Airship," by Mr. B. G. Simmons. The premium was handed to Mr. Grimmond by Councillor Sir Archibald Dawnay, Mayor of Wandsworth, on the occasion of the 138th certificate distribution. at which he presided on December 19th.

Municipal Work in Progress and Projected.

The Editor invites the co-operation of SURVEYOR *readers with a view to making the information given under this head as complete and accurate as possible.*

The following are among the more important projected works of which particulars have reached us during the present week.

ROADS AND MATERIALS.

Bideford T.C.—The town council have appointed a sub-committee to make inquiry as to the price of the Marshes on the Strand, with a view to the provision of a better road to Northam, and also for building purposes.

Brentford U.D.C.—The council have replied to the Commissioner of Police for London that they are in accord with the practice of the London County Council in marking all road obstructions, openings and dangerous places with red lights.

Chorley R.D.C.—The highway surveyor has been instructed to prepare a report showing works which have been deferred, with new estimates in comparison with the original estimates, together with a statement as to the arrears of ordinary maintenance of highways which have accrued during the war.

Down C.C.—The council have adopted a recommendation of the Finance Committee in favour of further advances of salary for the assistant surveyors in consideration of the cost of living in war time.—The council decided to prosecute several road contractors for failing to supply materials and to complete their steam-rolling contracts.

Evesham R.D.C.—The council have taken a serious view of the condition of various roads in the Hill district, and have passed a resolution deploring the continued refusal of the Road Board to grant the necessary permits for obtaining material, stating that this action has already necessitated the closing of roads to horse and motor traffic.

Hailsham R.D.C.—The council have received from the owner a strip of land necessary for making a road improvement nearly opposite the point where Victoria-road runs into Blacksmith's-lane, Herstmonceux, and Wartling, and the surveyor has received instructions to carry out the work.

Helmsley R.D.C.—The surveyor, Mr. W. Hunton, reported that he had found it necessary largely to increase his estimates for stone for the highways for the half-year ending March 30, 1920. The quantity was originally put at 10,970 tons, which, compared with the estimates for 1914-15, represented an increase of 7,000 tons. But the roads were in a serious state—in fact, rotten in places.

Holme Cultram U.D.C.—Objection was taken to the amount of the grants made by the county council for the upkeep of the main roads in the district, and it was suggested that the county council should be asked to maintain the roads themselves. A resolution was passed asking for a supplementary grant for the maintenance of the roads that had been damaged by the conveyance of war material.

Meriden R.D.C.—The council have authorised the appointment of a surveyor to inspect and report on roads likely to be affected by timber haulage in the district, with a view to the protection of the council in the event of a claim for extraordinary damage having to be made.

Middlesex C.C.—It is stated that as soon as circumstances permit the postponed scheme for the construction of the Great West Road will be begun. It is proposed that the work shall be carried out under contract instead of by direct labour.

Stockbridge R.D.C.—The council have agreed to the suggestion of the surveyor, Mr. W. J. Ayles, to carry out repairs to Dean-road by filling up the ruts with 400 or 500 tons of rough stone, which, he stated, would cost about 10s. per ton delivered on the road. The surveyor added that it would take 500 tons of granite to make the road fit for traffic, at 18s. per ton; but no action was taken with respect to this.

Thurles U.D.C.—The council have agreed to purchase for £100 the interest of certain owners in the quarry site at Loughnafulla.

REFUSE COLLECTION AND DISPOSAL.

Stalybridge T.C.—The town council have appointed a sub-committee to consider and deal with the question of the collection and utilisation of waste and dormant materials, as recommended by the National Council.

WATER, GAS, AND ELECTRICITY.

Axminster U.D.C.—The council have replied to a letter from the Local Government Board that they are not prepared to proceed with the construction of a new reservoir, as they are awaiting the release from the army of their engineer, Captain George.

Birkenhead T.C.—The town council have applied to the Local Government Board for an order to extend for a further period of five years the time limited by the Birkenhead Corporation Water Act, 1907, for the completion of the Alwen reservoir.

Birmingham T.C.—It was reported that the number of street lamps lighted before the signing of the armistice was 1,048, and that the number now lighted was 1,600, an increase of 552. The policy of the department was to improve the street lighting first of all in main thoroughfares and at dangerous crossings, and this was being carried out as rapidly as possible with a depleted staff. After that an improvement of the lighting in the side roads would be undertaken. The departmental staff at the outbreak of war was 450, but now it was only 60; before the war there were 247 lamplighters, and now only six. The policy of the lighting department during the last few years has been to instal automatic lighting, and as soon as an adequate number of clocks can be obtained the system will be adopted throughout the city.

Blackburn T.C.—The borough and water engineer, Mr. A. T. Gooseman, and the borough treasurer, Mr. J. H. Bailey, have submitted a joint report to the Waterworks Committee on the question of charges for water in relation to the financial position of the undertaking, and as a result, the town council have resolved to increase the charges for a domestic supply from 8 to 10 per cent on the rateable value with certain additional charges. A list of miscellaneous extra charges has also been adopted, while the charges for water for houses and shops, and also for lock-up shops, are to be increased by 25 per cent on present charges. It is proposed that a graduated increase in the charges for supply by meter be made, commencing with 3 per cent on 101,000 gallons per quarter and over, gradually increasing up to 25 per cent on 1,000,000 gallons per quarter and over; also that the present allowance of 10 per cent to consumers by meter for payment within ten days be reduced to 5 per cent, and fourteen days allowed instead of ten in which to pay the account. It is estimated that these additional charges will increase the annual income by £7,900 per annum.

Burnley T.C.—The town council are applying to the Local Government Board for authority to purchase land for the extension of the gasworks.

Cardiff T.C.—Mr. C. H. Priestley, the water engineer, reported to the Waterworks Committee as to the type of pipes to be used in the new Taff Fawr main. Taking into account the nature of the district through which the pipes would pass, and the consequent danger from subsidence in the vicinity of collieries, &c., it was recommended that reinforced concrete pipes should be used. The total cost of such pipes over the 30 miles of laying would be £309,089. The chairman and Mr. Priestley were instructed to visit places in order to make further investigation from those who had a practical experience of the particular pipes required in localities in Belgium and France similar to the Welsh mining districts.

Cork T.C.—It was reported that, as a result of the vigilance of the water inspectors, there had been a reduction of 4,000 gallons per hour in the night flow of the city water supply.

Driffield R.D.C.—Messrs. Fairbank & Sons, engineers, of York, are to be consulted as to the expediency of putting down a ram pump as a means of obtaining a water supply for Butterwick.

Forehoe R.D.C.—The council have asked the Local Government Board to hold at once a special inquiry into the urgent need of a system of water supply and drainage for Wymondham.

Kenilworth U.D.C.—The council have agreed to obtain six more automatic lighters, and have also instructed the surveyor, Mr. S. Douglas, not to light street lamps on the three nights immediately preceding and succeeding the full moon.

Kidsgrove U.D.C.—The council have accepted the tender of the British Gaslight Company to light one-half of the street lamps in the Newchapel Ward at £2 18s. 6d. per lamp per year, with the reservation that, in the event of a curtailment of lighting through the policy of the Coal Controller, a corresponding adjustment in the charge be made.

King's Lynn T.C.—To meet the demands for electric current, it is proposed to lay a main across the river, at an estimated cost of £3,000, and spend £7,500 upon extensions at the central station.

Naas U.D.C.—Mr. F. Bergin, engineer, reporting on the waterworks, stated that, as far as he could judge, the deficiency in supply was due to waste and to leakage in some part of the system. He advised the council to have an inspection made of all the water fittings, and also to appoint a permanent inspector.

Nenagh U.D.C.—Mr. Moynan, the council's engineer, has received instructions to prepare plans for an improved water supply, at a cost approximately of £3,000.

Newport (Mon.) T.C.—The town council have deposited their Bill for the next Session of Parliament for powers to construct additional waterworks in the neighbourhood of Talybont, including an impounding reservoir (to be known as the Caerfanell reservoir), to be formed by means of a dam across the Caerfanell stream above Pont Rhyd-y-bine, and a service reservoir in the parish of Malpas. Between these reservoirs aqueducts will be laid. The time sought within which to complete the reservoir is ten years from the date upon which the corporation are permitted to borrow money for its construction. The estimated cost of the scheme is £1,042,000.

Stratford-on-Avon R.D.C.—Mr. J. E. Willcox, engineer, in a report on the Alveston water supply, recommends alternative works, estimated to cost £800 and £1,450, and the council have resolved to ascertain the views of the parish with respect to the matter.

SEWERAGE AND SEWAGE DISPOSAL.

Paignton U.D.C.—It was reported that there were splendid crops of oats, straw, and mangolds from the sewage farm, and it was believed the surplus would go far towards meeting the cost of a corn-crusher or bruiser and chaff-cutter.

MISCELLANEOUS.

Glamorgan C.C.—The council have authorised the Agricultural Committee to plant trees on trial plots with a view to speeding-up a scheme of reafforestation.

Monifieth T.C.—A committee has been appointed to consider a proposal to convert the waste ground at the west side of the gasworks into a recreation ground, with a memorial in the centre.

Okehampton T.C.—The town council have referred to the General Purposes Committee a proposal that the Government should be asked for surplus stock returned from France for the purpose of constructing a light or a standard gauge railway from Torrington to Okehampton. The adjoining local authorities have been asked to support the application.

Rhyl U.D.C.—The surveyor, Mr. A. A. Goodall, reports that he has experimented successfully with star grass for preventing the sand accumulations on the promenade. This grass binds the sand together, and prevents it blowing about. The sandhills where Fleetwood now stands were similarly treated seventy or more years ago, and St. Annes more recently adopted the same expedient.

Stockton T.C.—The town council have decided upon the necessary legal steps to promote a Bill for the purchase of the local tramway, motor 'bus, and ferry undertakings.

Worcestershire C.C.—The council have given a general approval to the County War Agricultural Executive's scheme for the construction of light railways.—The General Purposes Committee have been asked to report upon the best means of carrying out the proposals made by Mr. P. E. Martineau, of Birmingham, for utilising waste land in the county for reafforestation purposes.

LOCAL GOVERNMENT BOARD INQUIRIES.

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INQUIRY HELD.

Lincoln T.C. (December 11th. Colonel T. C. Ekin).—£250,000 for the acquisition of, and extension to, Messrs. Clayton & Shuttleworth's power station for supplying electricity to Messrs. Ruston & Hornsby's, Limited, and other works.—The town clerk said the application was to enable the corporation to acquire the power station—a war creation—and to extend it as a generating station.

APPLICATIONS FOR LOANS.

Bristol T.C.—£88,000 for electricity extensions.

Evesham R.D.C.—£9,800 for the erection of twenty-four cottages at Badsey, and £5,750 for cottages at South Littleton.

LOANS SANCTIONED.

Bolton T.C.—£1,500 for an electricity main.

Fulham B.C.—£8,150 for electricity purposes.

Stepney B.C.—£12,000 for electricity extensions.

Municipal Officials' War Bonuses.—The President of the Local Government Board has under consideration the variations in the amounts of war bonuses granted to the administrative, technical, and clerical staffs of local authorities, and in a recently-issued circular to those bodies says he thinks that, generally speaking, councils in making grants might properly take the Civil Service scale for guidance, except in the case of part-time and resident officers, the allowance to whom would be regulated by the special circumstances of their employment.

PERSONAL.

Mr. H. C. Fread, surveyor to the Esher and Dittons Urban District Council, has had his salary increased to £450 a year.

Sir John Snell has been appointed to act as Adviser to the Board of Trade on all matters arising out of the report of the Electrical Power Supply Committee.

Romsey Rural District Council have applied for the release of the surveyor, Lieutenant C. Dyson, from military service, and have received a reply that demobilisation is proceeding and his case will be considered.

Lieutenant Charles W. Glass, M.C., Argyll and Sutherland Highlanders, who on the outbreak of war was a member of the staff of the Master of Works, Edinburgh, has been awarded the Serbian Order of the White Eagle with Cross Swords. Lieutenant Glass has been twice wounded, and once mentioned in despatches.

Commander Sampson Sladen, R.N., chief officer of the London Fire Brigade since 1909, has resigned after close on twenty years' service. In view of the special difficulties under which the work of the brigade has been carried on during the last four years, and the fact that Commander Sladen has acted as mobilising officer of fire brigade in a district covering an area of 750 sq. miles around London, the London County Council have granted him a pension of £720 a year, the amount to which he would be entitled after twenty-five years' service.

BLACKPOOL BOROUGH SURVEYORSHIP.

At the Highways Committee of the Blackpool Town Council the question of the appointment of a borough surveyor in succession to the late Mr. J. S. Brodie was mentioned last week. Mr. A. R. Carter, deputy borough surveyor, has been appointed acting borough surveyor, and it was understood that at the end of a certain period the question as to a final appointment would be considered, and also an increase of salary. Mr. Carter's salary is at present £400 a year. After some conversation, in the course of which reference was made to the satisfactory manner in which Mr. Carter had fulfilled his duties, it was decided to defer the question of filling up the position for a month. In the meantime a recommendation has been submitted to the Staff Salaries Sub-committee that Mr. Carter's salary should be at the rate of £600 a year.

OBITUARY.

Mr. Jeremiah Skidmore, who was surveyor to the Ambleside Urban District Council from 1897 to 1914, when he retired, died recently, we regret to state, aged seventy-nine.

Mr W. W. Walker, surveyor to the Alford Urban District Council, died recently, we regret to state. At their last meeting the council passed a vote of condolence with the widow.

Metropolitan Water Board's New Offices.—At the last meeting of the Metropolitan Water Board it was reported that a licence had been granted to proceed with the construction of the board's new head office in Rosebery-avenue.

FOR OTHER ADVERTISEMENTS

See End of Paper.

NORFOLK COUNTY COUNCIL.

TENDERS FOR GRANITE, SLAG AND TAR-MACADAM, 1919-20.

The Norfolk County Council invites Tenders for the supply of Granite, Slag, and Tar-Macadam for the year ending 31st March, 1920. Full particulars can be obtained from the undersigned.

Tenders to be delivered not later than 11th January, 1919.

W. W. GLADWELL,
County Surveyor.

Shirehouse, Norwich.
December 21, 1918. (3,983)

ASSISTANT ENGINEERS required for three years' service in the Public Works Department of the Federated Malay States, with possible extension, to survey, level, and take out quantities; to assist in the preparation of drawings and estimates, the control of expenditure, and the supervision of works, to organise and control labour, to take charge of stores, plant, &c., and to make payments to workmen.

Salary £360-£15-£480, with a duty allowance of £75 a year. Free passages.

Candidates who have received a good theoretical training, preferably at a University or Engineering College recognised by the Institution of Civil Engineers, or have completed their articles with Civil Engineers of standing, and passed the A.M.Inst.C.E. Examination, should apply, at once, by letter, giving full particulars to the Crown Agents for the Colonies, 4 Millbank, London, S.W. 1, quoting M/8320. (3,984)

INSTITUTION OF WATER ENGINEERS.

WINTER GENERAL MEETING IN LONDON.

The twenty-third winter general meeting of the Institution of Water Engineers was held on the 13th inst., at the apartments of the Geological Society, Burlington House, London, with the president, Mr. F. W. McCullough, in the chair. The attendance included Messrs. John Chisholm (Airdrie), R. B. Rigby (Bury), J. White Lewis (Farnham), Dawson Kitchingman (Southampton), Herbert Lapworth (Westminster), J. C. Barrowclough (Batley), H. Bicknell (Westminster), Herbert Watney (Buckhold), Wm. Whitaker (Croydon), Carle Salter (London), C. J. Batley (Oldham), E. A. Borg (Margate), J. W. Wilkinson (Ludlow), Cecil H. Roberts (Aberdeen), F. Walter Hodson (Loughborough), E. J. Silcock (Westminster), F. H. Brunt (Rochdale), W. J. E. Binnie (London), S. C. Chapman (Torquay), C. Clemesha Smith (Wakefield), H. Austin Palmer (Staines), Arthur Valon (Westminster), C. H. Priestley (Cardiff), A. E. Cornewall-Walker (Reigate), Fred. J. Dixon (Birmingham), L. Holme Lewis (Manchester), H. J. Rofe (Westminster), C. B. Newton (Hull), F. W. Davis (Nottingham), Gilbert Christie (Kilwinning), Wm. Paterson (London), A. B. E. Blackburn (Sunderland), Walter Clemence (Nottingham), John Hopkinson (Watford), Alfred W. Oke (Southampton), Wm. Matthews (Westminster), H. C. Head (Winchester), G. T. Edwards (Leicester), Henry C. Adams (London), G. R. Collinson (Swansea), Charles P. King (Bexhill-on-Sea), W. T. Burgess (London), and Percy Griffith (Westminster) secretary, members; and Sir Napier Shaw (London), H. R. Mill (London), F. Pullen Candy (Westminster), J. Fairgreive (London), J. E. Edmondson (Manchester), and E. W. Atkinson (London) —visitors.

The President, in opening the proceedings, said he was sure they would expect him to refer to the happy conditions in which they met before they proceeded to the ordinary business. They elected him as president in December, 1914, in the early stages of the war, and, despite many difficulties, they had continued to hold their ordinary business meetings. They had been at war now for over four and a quarter years with the most unscrupulous enemies in the world's history. They had won a glorious victory, and thereby, he hoped, brought permanent peace to the world. Many of them had lost their nearest and dearest ones, others had suffered in other ways, but they must all strengthen themselves to take up the new conditions of peace and try and bring about a better condition of things for future generations.

THE INSTITUTION FINANCES.

Mr. C. H. Priestley, in proposing the adoption of the statement of accounts, said he thought they might congratulate themselves generally on their financial position. The committee had done the best they could to keep the expenses down during the last four years, so that they might have a balance in hand to meet future work. He thought they would probably require more money in the future to carry on the institution than they had been spending during the past few years, and he hoped, therefore, that all of them would do their best to increase the subscriptions.

NEW MEMBERS.

Mr. Percy Griffith, the secretary, announced the names of candidates elected by the council since the last general meeting as follows: As members: Messrs. R. Watson (Victoria, West Africa) and C. J. Batley (water engineer, Oldham). As associate members: Messrs. L. B. Williams (resident superintendent, Chorley Water Supply, Liverpool Corporation Waterworks), and J. Monteith (assistant water engineer, Irvine and District Water Board). Transferred from class of associate member to that of member: Mr. C. Baldry (Chesterfield).

OFFICERS AND COUNCIL: THE NEW PRESIDENT.

The President announced that the voting for officers and council for the ensuing year as reported by the scrutineers had resulted as follows:—

President—Mr. A. B. E. Blackburn (Sunderland).

Vice-presidents—Messrs. F. J. Dixon (South Staffordshire) and C. H. Priestley (Cardiff).

Ordinary members of council—Messrs. W. J. E. Binnie (Westminster), A. E. Cornewall-Walker (East Surrey), F. W. Davies (Nottingham), H. C. Head (Winchester), L. H. Lewis (Manchester), C. B. Newton (Hull), F. Storr (Wrexham), J. Chisholm (Airdrie and Coatbridge), J. S. Pickering (Cheltenham), and H. Lapworth (Westminster).

Mr. Blackburn said he had to thank the members for having elected him president for the ensuing twelve months. He knew he had a very difficult task to follow so admirable a president as they had had in Mr. McCullough. They owed the latter a deep debt of gratitude, which he was sure they would be only too happy to express at the proper time, for the admirable way in which he had filled the presidential chair during the strenuous times of war. As far as he (Mr. Blackburn) was concerned, he would do his utmost to maintain the dignity and usefulness of the institution during his term of office. As to whether the summer meeting would be held in Sunderland or elsewhere, no decision had yet been arrived at.

Three papers—"The Relation of Rainfall to Configuration," by Mr. Carle Salter; "Stream Flow and Percolation of Water," by Mr. Samuel Hall (Belfast); and "The Freezing of a Reservoir Outlet Works," by Mr. Gilbert Christie (Irvine and District Water Board)—were submitted for discussion in the course of the proceedings, and will be reproduced in due course in our pages.

STIRLING'S PROPOSED NEW RESERVOIR.

BURGH SURVEYOR AND THE POST OF ENGINEER.

Some time ago when the Stirling Water Commission resolved to construct in the near future a new reservoir at the Touch Hills to provide for a much-needed augmentation of the local water supply, it was resolved, with a few dissentients (the *Stirling Observer* states), that Mr. A. H. Goudie, the burgh surveyor and water engineer, should be asked to take the post of engineer, instead of employing an engineer specially to superintend the work. The sanction of the town council was, however, necessary to the appointment of Mr. Goudie, and at a meeting on November 29th the matter was discussed. Ultimately it was resolved to approve the proposal, but this was only carried by twelve votes to seven, and Mr. Goudie informed the sub-committee of the commission that he could not see his way to accept the post in view of the lack of unanimity in the council. A few of the minority, our contemporary understands, were dubious as to Mr. Goudie's qualifications to act as engineer, and the others considered that his duties as burgh surveyor required all his time. The sequel took place at the last meeting of the Water Commission, when Provost Raffan formally moved the approval of the sub-committee's minute.

In the course of the discussion sympathy was expressed for Mr. Goudie upon the stand he had taken. They had, Councillor Derrick stated, the most able engineer that could be got for the addition to the reservoir, but, apart from the question of ability, they would lose from £600 to £900 by having to get another engineer. With respect to the statements by some speakers that Mr. Goudie had already enough to do as burgh engineer, it was pointed out that they would not get an independent engineer any more than the burgh surveyor to devote his whole time to this particular contract.

In the end it was left to the sub-committee to consider and report as to the appointment of an engineer.

Mr. Goudie, in the course of a brief statement, thanked the commissioners for their remarks regarding himself. He was as sorry for the position as any of them, and the only thing he would like to add was to state that he did not ask the commission for the appointment of engineer.

BUILDING LICENCES ABOLISHED.

The Ministry of National Service announces that the requirement of licences for building schemes is cancelled.

The Secretary of the War Office announces that the control of distribution of cement by the War Office by means of priority certificates has been brought to an end. Manufacturers and merchants are now at liberty to execute orders without any form of certificate, provided that in all cases priority is accorded to Government orders. The export of cement will continue to be governed by the necessary export licences as heretofore.

Littleton Reservoir Contract.—Application is being made by the Metropolitan Water Board for the removal of the war-time restrictions on the construction of the Littleton reservoir and other urgent works.

Lighting of Road Obstructions.—The borough surveyor of Chelsea, Mr. T. W. E. Higgens, reporting on the circular of the Commissioner of Police with reference to the proper lighting of road obstructions in the dark, states: "The essential requirement for street obstructions at night is sufficient light to show the position of the obstruction. If this cannot be arranged a system of red lights is no doubt very necessary; but a hard-and-fast rule to be enforced by the police is not desirable and quite unnecessary if the obstruction is sufficiently indicated. Considerable danger is caused, both night and day, by careless driving. If the police would take steps to stop this there would be fewer accidents." The borough council have decided to transmit a copy of the report to the Commissioner of Police.

RECENT PUBLICATIONS.*

MEMOIR OF THE GEOLOGICAL SURVEY, ENGLAND AND WALES; THE WATER SUPPLY OF ESSEX FROM UNDERGROUND SOURCES. By W. Whitaker, B.A., F.R.S., and J. C. Thresh, M.D., D.SC., D.PH., F.I.C. THE RAINFALL. By H. R. Mill, D.SC., LL.D. Price 15s. nett.

It would be impossible to overstate the value of the publications of the Geological Survey to engineers. The water supply Memoirs, as they appear from time to time, deal with a subject which is generally treated as being merely of local importance, although for many years past it has been recognised that the water supply of the country is a matter of national importance and one which ought to be dealt with by a central administrative authority. The Memoirs published by the Geological Survey, however, provide the basis upon which the work of the future can be done.

The present Memoir contains, in addition to well records, chapters dealing with the water-bearing beds, rainfall and chemistry of the Essex water with analyses, and a most important section dealing with contamination and the risk thereof, while the supplies from springs, wells and borings are duly recorded. It is accompanied by an extensive bibliography and by maps showing underground water levels, some of the chemical constituents of deep well water such as chlorine and alkaline constituents, and the rainfall.

Copies may be obtained through any bookseller from Messrs. T. Fisher Unwin, Ltd., 1 Adelphi-terrace, London, W.C., who are the sole wholesale agents to the trade outside the County of London; or from the Director-General, Ordnance Survey Office, Southampton.

Holidays for Demobilised Men.—Harrogate Town Council have resolved that, in the event of officials or employees of the corporation who have served with the colours desiring a holiday after discharge, prior to taking up their employment, the corporation continue to pay for such a period not exceeding four weeks.

Professional Defence.—The council of the Society of Architects has established, with the guidance and approval of its legal advisers, regulations enabling members in certain cases to apply to the society for advice on points of law arising out of their professional practice and for assistance in helping them to defend cases where questions of professional principles are involved. This scheme is an extension of the scope and power of a Board of Professional Defence set up by the council some years ago, in connection with which the nucleus of a Defence Fund is already in hand.

APPOINTMENTS VACANT.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

ASSISTANT SURVEYOR.—December 31st.—Wellingborough Urban District Council.—Mr. R. Stevenson Henshaw, engineer and surveyor, Council Offices, Market-square, Wellingborough, Northants.

SEWAGE WORKS MANAGER.—January 1st.—Enfield Urban District Council.—Mr. T. W. Scott, clerk, Public Offices, Enfield, Middlesex.

SANITARY AND HIGHWAY SURVEYOR.—January 1st.—Uxbridge Rural District Council. £250 a year.—Mr. Algn. R. Woodbridge, clerk, Council Offices, 38 High-street, Uxbridge, Middlesex.

ARCHITECT.—January 6th.—Aberdare Urban District Council. £450 a year.—Mr. W. R. Morgan, clerk, Town Hall, Aberdare.

ARCHITECTURAL ASSISTANT.—January 6th.—Doncaster Town Council. £200 a year.—Mr. R. E. Ford, acting borough surveyor, Mansion House, Doncaster.

TEMPORARY ARCHITECTURAL ASSISTANT.—January 11th.—Glyncorrwg Urban District Council. £4 10s. per week.—Mr. W. P. Jones, surveyor, Council Offices, Cymmer, Port Talbot, Glamorgan.

SURVEYOR.—January 31st.—Romford Urban District Council. £335 a year, with war bonus of £35.—Mr. Charles T. King, clerk, Council Offices, Romford, Essex.

STEAM ROLLER DRIVER.—Aylesbury Rural District Council.—Mr. R. T. Stewart, surveyor, 21 Walton-street, Aylesbury.

CHIEF ENGINEER.—February 1st.—Metropolitan Water Board. £2,500 a year.—Mr. A. B. Pilling, clerk, 2 South-place, Finsbury-pavement, London, E.C. 2.

* Any of the publications reviewed, or referred to as received, will be forwarded by the St. Bride's Press, Limited, on receipt of published price, plus postage in the case of nett books.

MUNICIPAL COMPETITIONS OPEN.

OFFICIAL AND SIMILAR ADVERTISEMENTS RECEIVED UP TO 4.30 P.M. ON THURSDAYS WILL BE INSERTED IN THE FOLLOWING DAY'S ISSUE, *but those responsible for their despatch are recommended to arrange that they shall reach* THE SURVEYOR *office by noon on* WEDNESDAYS *to ensure their inclusion in the weekly list of summaries. Such advertisements may, in cases of emergency only, be telephoned (City No. 1046) subject to later confirmation by letter.*

BLAENAVON.—January 1st.—The urban council invite designs showing the lay-out of an area 18 acres in extent, for the erection of 140 houses. Premiums, £100 and £50.—Mr. J. Morgan, surveyor, Blaenavon, Mon.

BIRMINGHAM.—The Housing and Town-planning Committee invite designs for laying out an estate of 54 acres, together with designs for houses. Premiums, £150, £100 and £50.—The Town Clerk, Council House, Birmingham.

MUNICIPAL CONTRACTS OPEN.

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Buildings.

MERTHYR.—December 31st.—For the erection of thirty-four cottages.—The Borough Architect, Town Hall, Merthyr.

Roads.

SOMERSET.—December 27th.—For surface-tarring on main roads in various parts of the county during the coming summer.—Mr. Gordon R. Folland, acting county surveyor, County Surveyor's Office, Wells, Somerset.

SOMERSET.—January 18th.—For the steam rolling and scarifying on main roads in the Long Ashton Division.—Mr. Gordon R. Folland, acting county surveyor, Wells, Somerset.

SOMERSET.—January 18th.—For the supply of broken granite and basalt required on the main roads in the Long Ashton Division.—Mr. Gordon R. Folland, acting county surveyor, Wells, Somerset.

HENDON.—January 6th.—For about 142 yds. of 6-in. drain, 7 ft. deep, about 80 yds. super. limestone tar-paving laid on clinker foundation, and other incidental works.—Mr. S. Slater Grimley, engineer, Urban Council Offices, Hendon, Middlesex.

NORFOLK.—January 11th.—For the supply of granite-slag and tar-macadam for the year ending March 31, 1920.—Mr. W. W. Gladwell, county surveyor, Shirehouse, Norwich.

HERTS.—January 15th.—For the supply of broken granite, slag and tar macadam.—Mr. J. S. Killick, county surveyor, Hatfield, Herts.

Sanitary.

JOHANNESBURG.—January 8th.—For the supply of 5,000 sanitary pails with eyelet holes, and 5,000 lids for same.—Inquiry Office, Department of Overseas Trade (Development and Intelligence), 73 Basinghall-street, E.C. 2.

DUNDEE.—For the supply of 3,500 yds. of fireclay sewer pipes, and 60,000 common red bricks.—Mr. Jas. Thomson, city engineer, 91 Commercial-street, Dundee.

Stores.

HORNSEY.—January 6th.—For the supply of cartage, paving, granite, Portland cement, general stores and ironmongery, disinfectants and bituminous road materials.—Mr. E. J. Lovegrove, borough engineer and surveyor, Town Hall, Southwood-lane, Highgate, N. 6.

ST. PANCRAS.—January 6th.—For the removal of road sweepings and gully soil, horsing water vans, horsing road sweeping and other machines, cartage, Yorkshire stone and artificial paving slabs, granite kerbs, paving setts, broken granite and Kentish rag, gravel and other roadway materials, lime, cement, bricks, stoneware pipes and other glazed goods, pitch, tar, creosote oil, carbolic powder and coke.—Mr. W. Nisbet Blair, borough engineer and surveyor, Town Hall, St. Pancras-road, N. 1.

HENDON.—January 6th.—For the supply of about 10,000 tons of broken Clee Hill, Welsh, Leicestershire and other granite, limestone, gravel, shingle, sewage precipitant, hire of horses and carts, hire of steam roller, castings, ironmongery, and standard tar.—Mr. S. Slater Grimley, engineer and surveyor, Urban District Council, Hendon, Middlesex.

ESSEX.—January 18th.—For the supply of team labour, stoneware pipes, granite kerb and setts, York kerb, distilled tar and broken granite.—Mr. Percy J. Sheldon, county surveyor, Chelmsford.

PLYMOUTH.—January 18th.—For the supply of various goods and materials for one year.—Mr. J. Paton, borough engineer, Plymouth.

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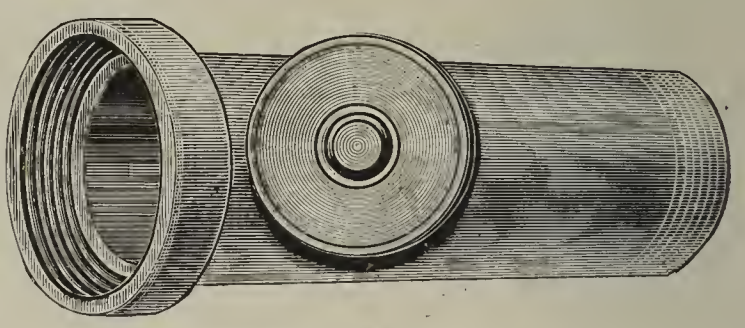

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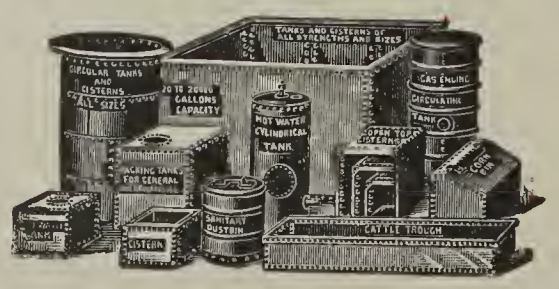

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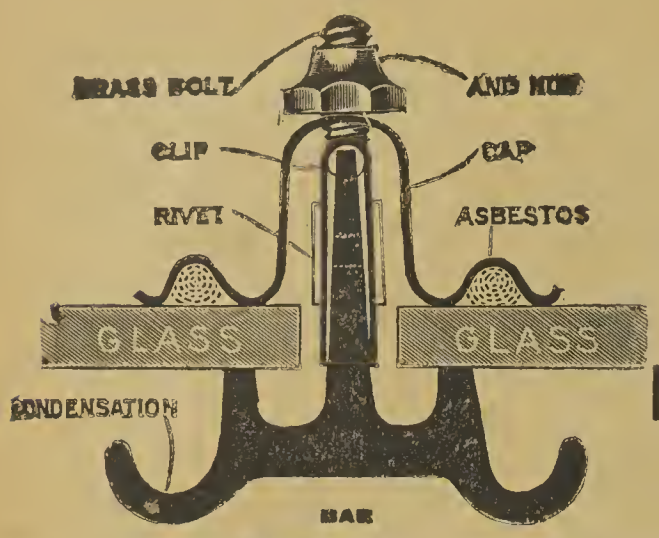

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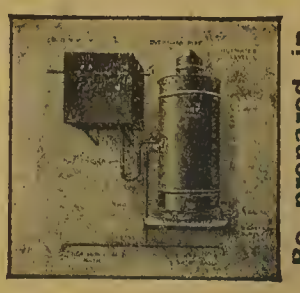

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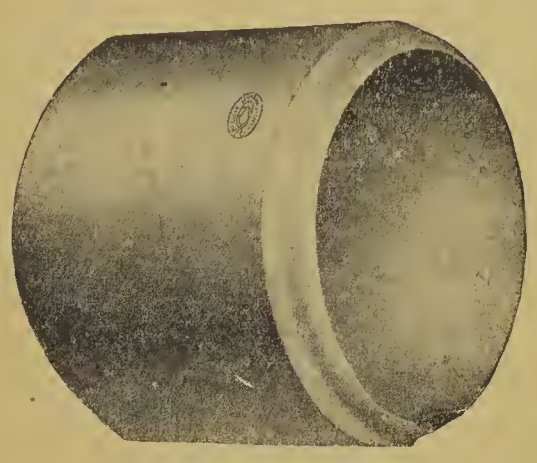

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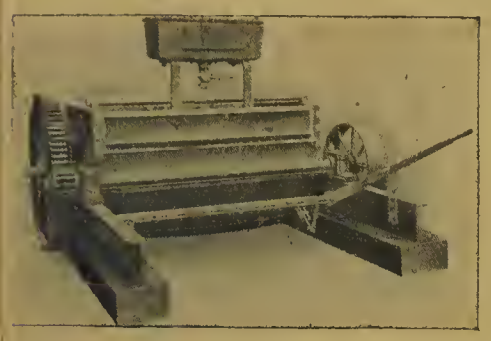

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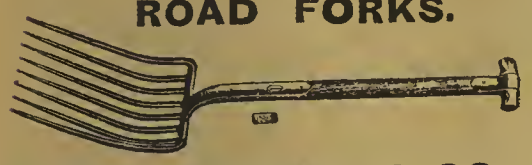

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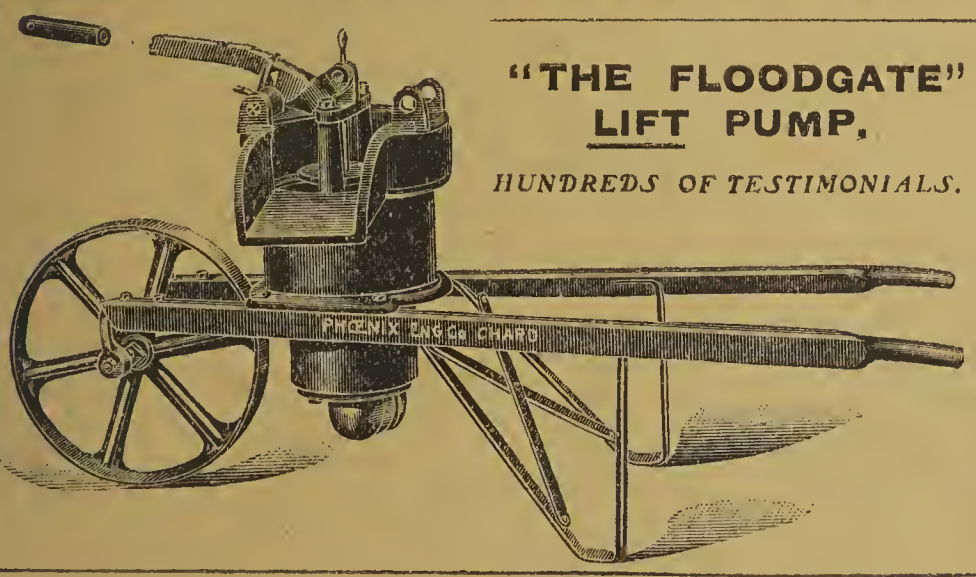

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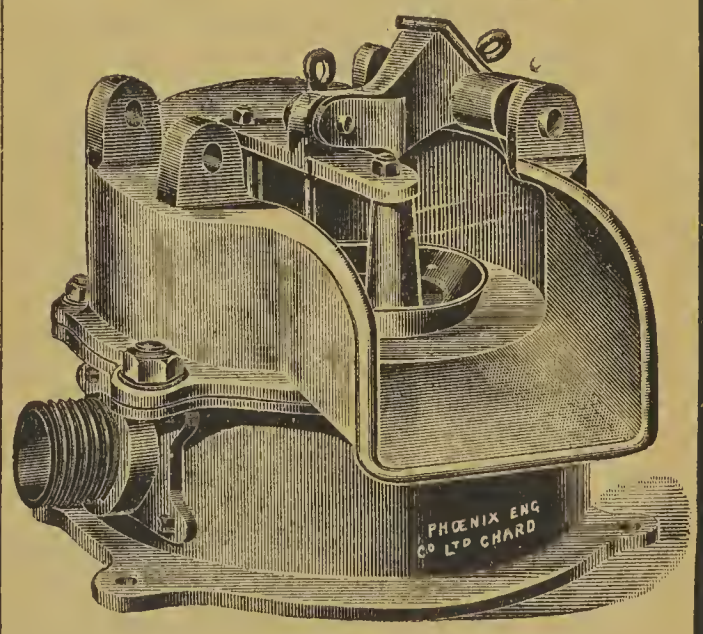

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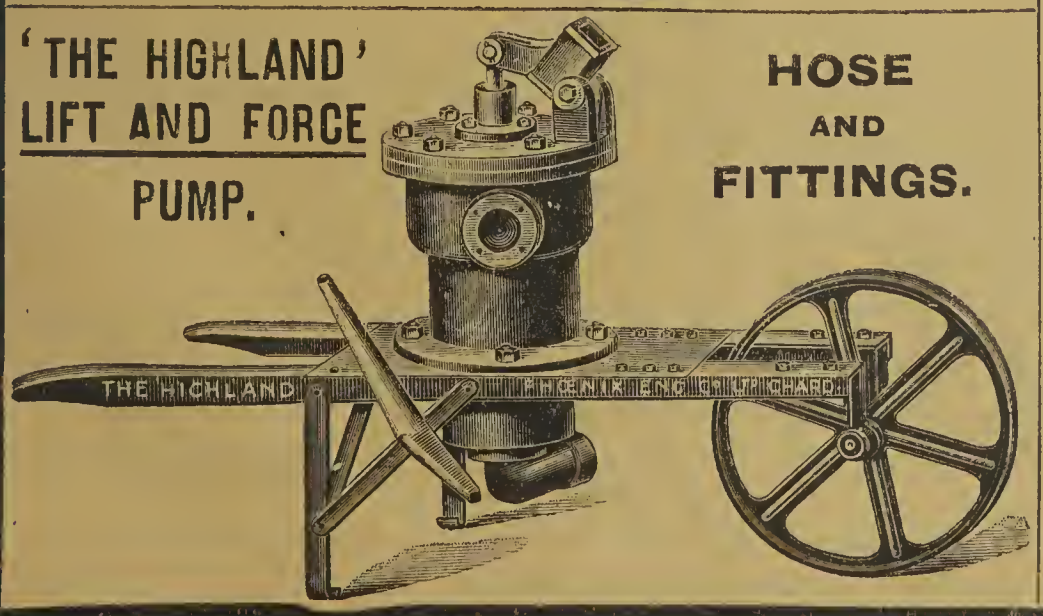

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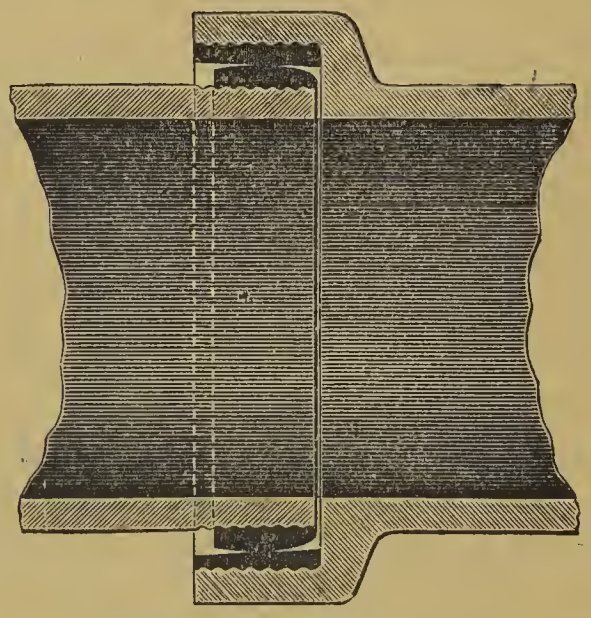

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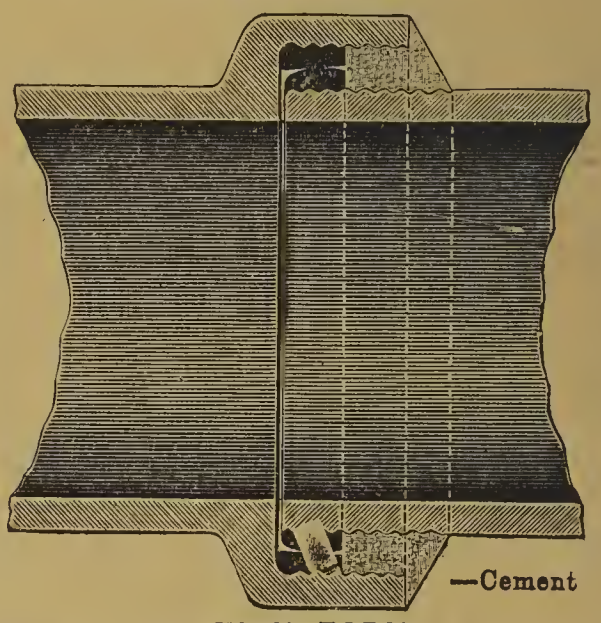

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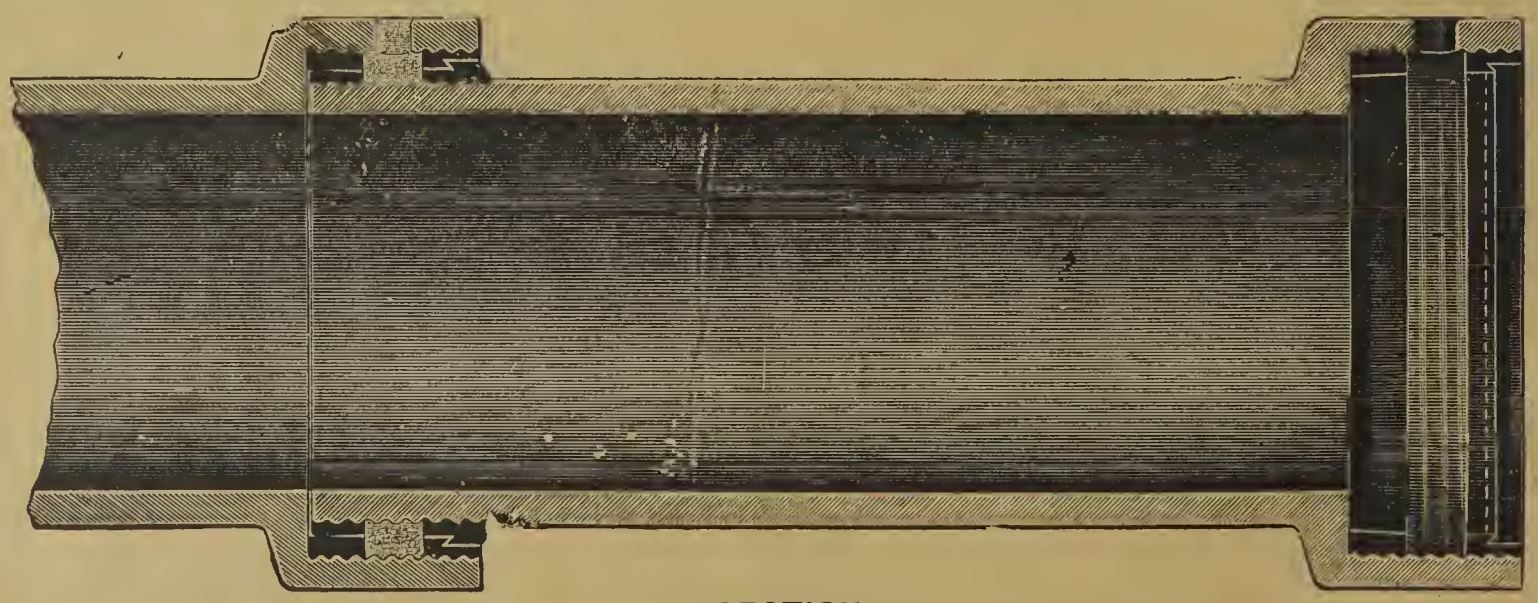

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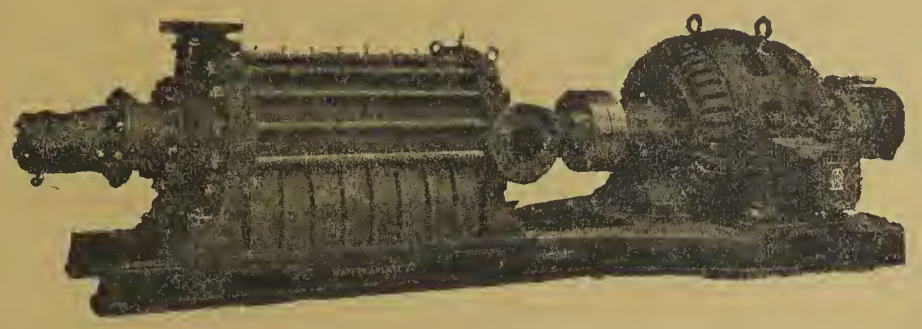

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TENDERS WANTED.

BOROUGH OF PLYMOUTH.

NOTICE IS HEREBY GIVEN that, after the expiration of 10 days from the date hereof, the CORPORATION intend to enter into CONTRACTS for the SUPPLY of the FOLLOWING GOODS and MATERIALS for one year:—

Schedule No. 1.—Bricks, Pipes, &c.
,, ,, 2.—Ironmongery.
,, ,, 3.—Section A.—Paints.
Section B.—Varnishes.
,, ,, 4.—Coal, Coke, and Rock Salt.
,, ,, 5.—Ironwork.
,, ,, 6.—Plumber's Work.
,, ,, 7.—Petroleum Oil.
,, ,, 8.—Broomheads.
,, ,, 9.—Household Brushes.
,, ,, 10.—Rope.
,, ,, 11.—Iron and Steel.
,, ,, 12.—Saddlery, Harness, &c.
,, ,, 13.—Pitchpine, Deals, Flooring, &c.
,, ,, 14.—Carbolic Powder.
,, ,, 15.—Portland Cement.
,, ,, 16.—Section A.—Lubricating Oils.

Samples to be submitted by Tenderers.

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,, ,, 17.—Tar and Pitch, includes refined tar for use in the construction of tarred macadam roads and for tar-spraying.
,, ,, 18.—Painters' Brushes.
,, ,, 19.—Explosives.
,, ,, 20.—Wheelwrights' Work.
,, ,, 21.—Street Cleansing and Watering (Districts 1, 2 and 3).
,, ,, 22.—Soap (Yellow, Carbolic, Toilet, Soft).
,, ,, 23.—Wood Blocks, Soft.
,, ,, 24.—Creosote.
,, ,, 26.—General Cartage:—
Section A.—Eastern District.
,, B.—Western District.
,, C.—Whole Borough.
,, ,, 27.—Road Metal.
,, ,, 28.—Disinfectant Fluid.
Schedule No. 29.—Granite Kerbs, Setts, &c.
,, ,, 30.—Linseed Oil, Turpentine and Turpentine Substitute.
,, ,, 31.—Refilling Machine Revolving Brooms.
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,, ,, 35.—Indiarubber Goods, Hose, &c.
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,, ,, 37.—Cleaning Windows.
,, ,, 38.—Collection and removal of House and Trade Refuse (Stonehouse Area).
,, ,, 39.—Gas, Water and Steam Pipes.
,, ,, 40.—Collection and Disposal of House and Trade Refuse (Peverell Area).
,, ,, 41.—Collection of House Refuse; Street Cleansing; Watering and Sanding Streets (Western Area).

With the exception of Schedules 4, 17, 19, 21, 23 to 29 inclusive, 31, 32, 37, 38, 40, 41, the Schedules include for the Supply and Delivery of materials to Wrangaton Station, Great Western Railway about 13 miles from Plymouth, for the Plymouth Borough Asylum.

Tenders must be based on the whole of a Schedule (with the exception of Schedules Nos. 3, 4, 16, 21, 22, 26, 29 and 36), and not on any particular item contained therein.

(Separate Tenders will be considered for Sections A and B of Schedule No. 3, also Sections A and B, Schedule 16, and Section A, B, C, Schedule 26.)

Schedules may be obtained from the undersigned, and the Contractor who applies for the Schedules must do so on the distinct understanding that he is willing to abide by the terms of this advertisement.

The lowest or any Tender will not necessarily be accepted.

Tenders to be delivered not later than Saturday, January 18th, 1919, addressed to the undersigned.

JAMES PATON,
Borough Engineer and Surveyor.

Municipal Offices, Plymouth.
December 18, 1918. (3,980)

ROAD MAKING.

REINFORCE CONCRETE ROADS WITH
EXPANDED METAL.

EXMOUTH SEA DEFENCE WORKS. Expanded Steel-Concrete Slope and Roadway. Length, 1 mile; total width of Roadway, 65 feet.
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ESSEX COUNTY COUNCIL.

HIGHWAYS COMMITTEE.

The Essex County Council are prepared to receive Tenders for the Year ending 31st March, 1920, for the Supply of Materials, Team Labour, &c., as set out in the Schedule below:—

1. Team Labour.
2. Stoneware Pipes.
3. Granite Kerb and Setts, York Kerb, &c.
4. Distilled Tar.
5. Broken Granite.

Forms of Tender, with the special envelope in which Tenders are to be delivered, and all other information and particulars, can be obtained at the County Surveyor's Office at Chelmsford.

Tenders to be delivered on or before Saturday, the 18th January, 1919.

PERCY J. SHELDON, M.INST.C.E.,
County Surveyor.

Chelmsford.
December 27, 1918. (3,982)

SOMERSET.

SOMERSET COUNTY COUNCIL.

TENDERS FOR STEAM ROLLING.

Tenders are invited for Steam Rolling and Scarifying on Main Roads in the Long Ashton Division during the year ending March 31st, 1920.

Specifications and Forms of Tender may be obtained from the undersigned, to whom Tenders, endorsed "Steam Rolling," must be delivered not later than 18th January, 1919.

The Council do not bind themselves to accept the lowest or any Tender.

GORDON R. FOLLAND,
Acting County Surveyor.

Wells, Somerset.
December, 1918. (3,977)

SOMERSET COUNTY COUNCIL.

TENDERS FOR ROAD MATERIALS.

Tenders are invited for the Supply of Broken Granite or Basalt required on the main roads in the Long Ashton Division, delivered to the various Stations and Docks in the neighbourhood of Bristol during the year ending 31st March, 1920.

Forms of Tender and Specifications may be obtained from the undersigned, and they must be delivered at the County Surveyor's Office, Wells, endorsed "Tenders for Road Materials," not later than 18th January, 1919.

The Council do not bind themselves to accept the lowest or any Tender.

GORDON R. FOLLAND,
Acting County Surveyor.

Wells, Somerset.
December, 1918. (3,978)

APPOINTMENTS OPEN.

BOROUGH OF DONCASTER.

ARCHITECTURAL ASSISTANT.

The Corporation of Doncaster invite applications for the position of Architectural Assistant in the Borough Surveyor's Department.

Candidates for the appointment should have had experience in housing and general architecture, and be competent quantity surveyors.

The salary will be £200 per annum.

Applications, stating age, qualifications and experience, accompanied by copies of three testimonials of recent date, should reach the undersigned on or before Monday, the 6th January, 1919, endorsed "Architectural Assistant."

Canvassing Members of the Council, either directly or indirectly, will be deemed a disqualification.

R. E. FORD, ASSOC.M.INST.C.E.,
Acting Borough Surveyor.

Mansion House, Doncaster.
December 20, 1918. (3,981)

For
PEACE - TIME
Extensions and Alterations
ASBESTOS - CEMENT
lightest, cheapest, most permanent fireproof material for
CORRUGATED ROOFING SHEETS, FLAT BUILDING SHEETS, AND ROOFING FITTINGS.
Big Stock for immediate delivery.
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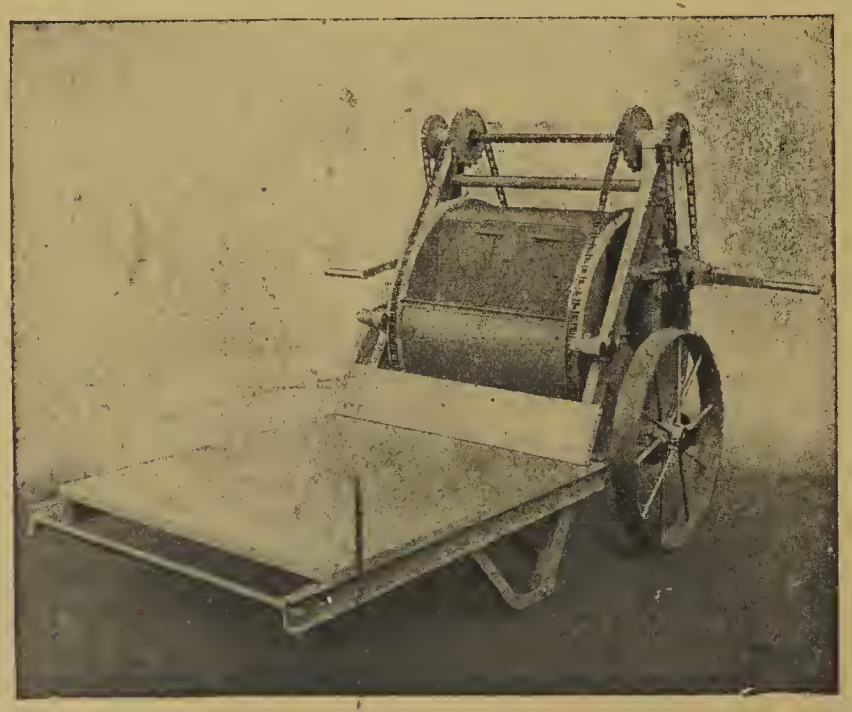

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JENKINS Bros
VALVES

Fig. 106

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Fig. 142

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Works—Montreal, Canada.

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Brewery Yard, Sheffield, for Messrs. Tennant Bros., Ltd. Reinforced with B.R.C. Fabric.

B.R.C. Fabric ensures a reliable permanent foundation on which to build a successful surface.

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Works: Trafford Park, Manchester

BRC Fabric

London: 36, Lime Street
Birmingham: 118, New St.
Liverpool: 36, Dale St.
Newcastle-on-Tyne: 2, St. Nicholas Buildings
Sheffield: 38, Church St.
Glasgow: 62, Robertson St.

B·R·C

GLYNCORRWG URBAN DISTRICT COUNCIL.

The above Council invite applications for a Temporary Architectural Assistant in the Surveyor's Department.

Applicants must have had Architectural training and experience in the designing and construction of Workmen's Dwellings and the laying out of Building Sites on approved modern lines, be competent in Surveying, Levelling, Specifications and Quantities; also be neat Draughtsmen.

Salary, £4 10s. per week, subject to three months' notice on either side.

Applicants to state age, qualification, previous experience, together with copies of three recent testimonials, to be delivered to the undersigned not later than January 11th, 1919.

W. P. JONES,
Surveyor.

Council Offices,
Cymmer,
Port Talbot. (3,979)

DEWSBURY UNION.

APPOINTMENT OF VALUER.

The Guardians of the Dewsbury Union invite applications from competent persons to Survey and Value new and altered property in the several parishes contained in the Union, and generally to carry out the duties prescribed, a copy of which may be obtained by sending a stamped addressed foolscap envelope to the undersigned. The remuneration to be a fixed annual sum (payable quarterly) for carrying out the work, and the appointment renewable from year to year, at the option of the Guardians, by an Annual Contract.

Persons desirous of Contracting must send written applications, showing experience and qualifications, accompanied by testimonials of recent date, and stating the total annual sum they will require for carrying out the work, to the undersigned not later than 10 a.m. on Wednesday, the 1st proximo, and those selected will receive due notice of the day of appointment.

Canvassing the Guardians will disqualify.

C. P. PICKERSGILL,
Clerk to the Guardians.

Union Offices,
Wellington-street, Dewsbury.
December 20, 1918. (3,976)

TO ENGINEERS AND SURVEYORS.

The Romford Urban District Council is desirous of appointing a Surveyor for their district. The salary offered is £335 per annum, rising by annual increments of £25 during the first three years, plus a war bonus of £35 per annum.

Applicants must have had previous experience of the duties of a Surveyor under the Public Health and other Acts, and be well acquainted with the provisions of such Acts.

The person appointed will be required to devote the whole of his time to the duties of the office, which will include all the duties usually required of a Surveyor under the several Acts which a Local Authority has to administer.

Applications must be made on forms which can be obtained at my office or will be forwarded on receipt of stamped addressed envelope, such applications to be accompanied by not more than three recent testimonials. The applications must reach me not later than the 31st January, 1919, endorsed "Surveyor."

Canvassing members will disqualify applicants.

No application will be considered from any person not having had previous experience.

The Council does not bind itself to make any appointment.

CHARLES T. KING,
Clerk.

Council Offices,
Romford.
December 6, 1918. (3,956)

MISCELLANEOUS.

FOR SALE—Thorneycroft 5-ton Steam Wagon, also Yorkshire 3-ton Steam Wagon; two end-tipping Trailers. All in good condition.—Apply, Johnston Brothers, 79 Mark-lane, London, E.C. (3,958)

FOR HIRE, 10-ton and 12-ton Steam Road Rollers and Scarifiers, with or without drivers.—W. W. Buncombe, Engineer, Highbridge, Somerset. Telephone, 12 Highbridge.

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Insurance against BOILER EXPLOSION and ENGINE BREAKDOWN.

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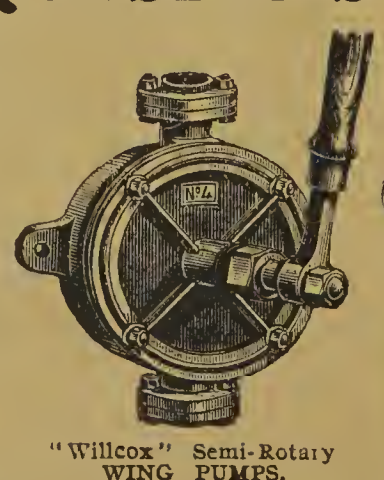

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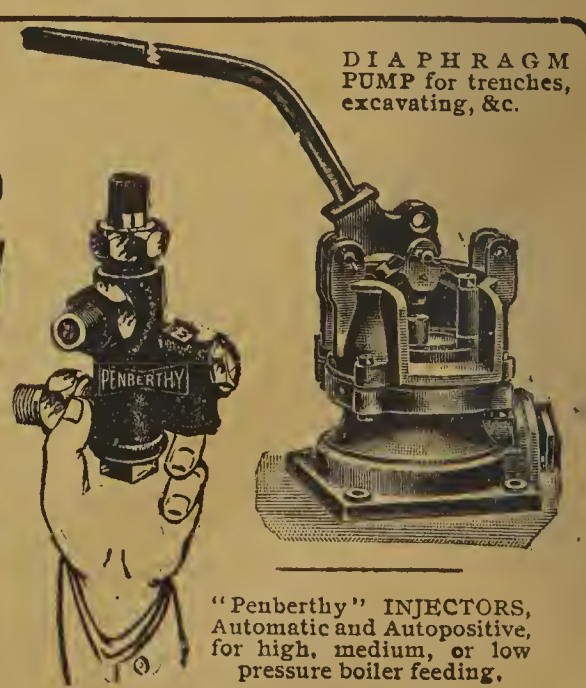

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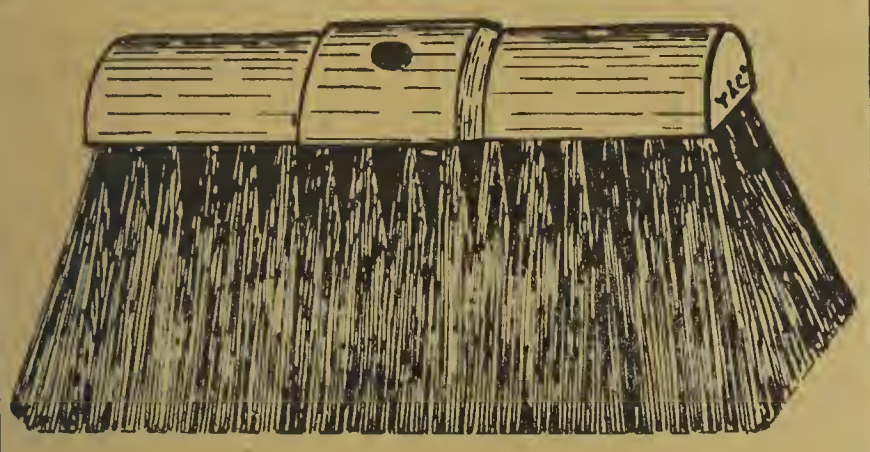

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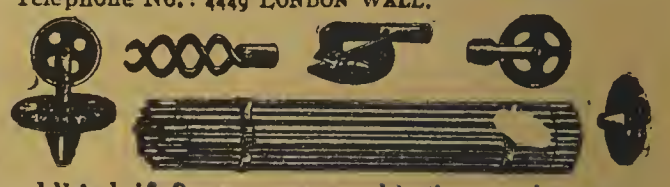

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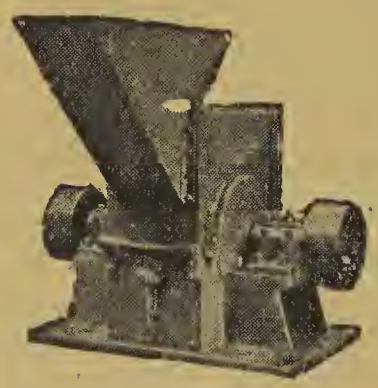

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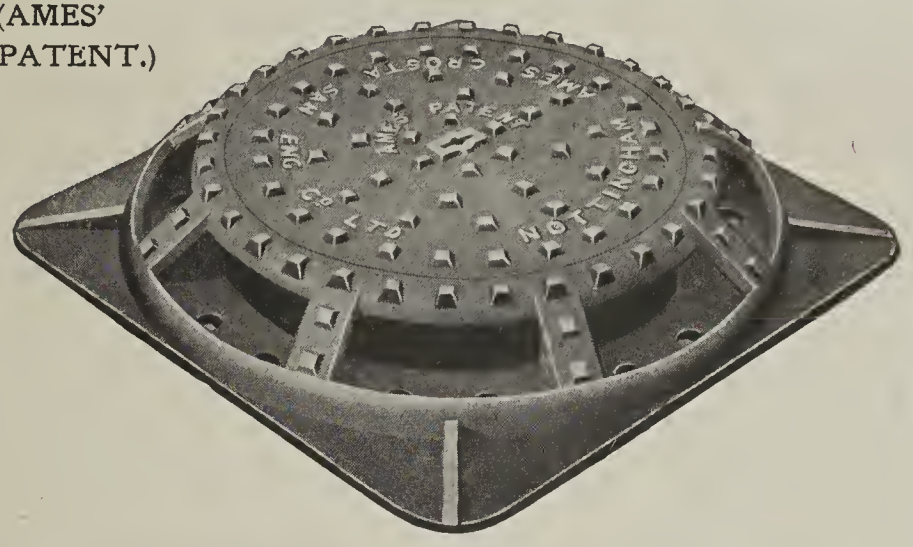

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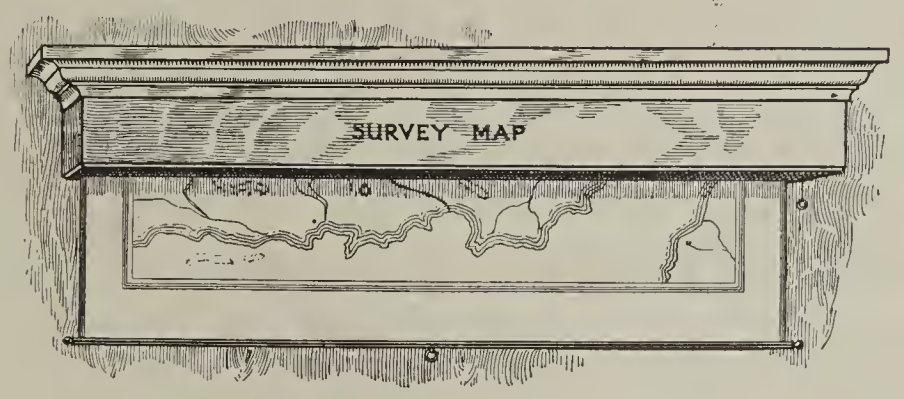

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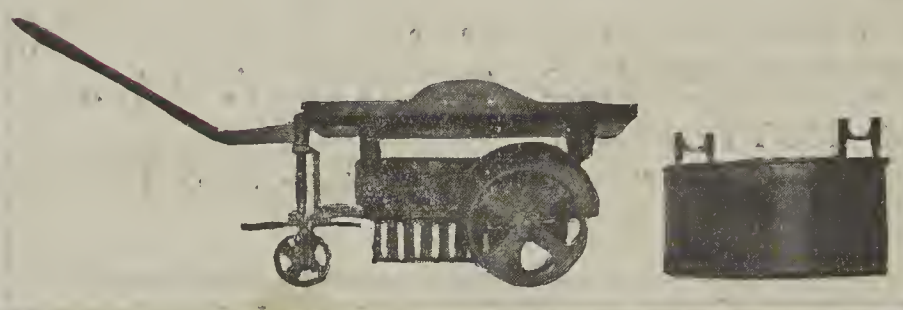

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